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ABSTRACT

The objectives of this study were twofold: (1) to empirically identify and analyze trained and untrained observers' affective responses to a representative collection of paintings for the purpose of constructing art differential instruments, and (2) to use these instruments to objectively identify and evaluate the major affective factors and components associated with selected paintings by trained and untrained observers. The first objective was accomplished by having 120 trained and 120 untrained observers elicit a universe of 12,450 adjective qualifiers to a collection of 209 color slides of paintings. Data analyses yielded subsets of adjective qualifiers most characteristic of trained and untrained observers' affective decoding of the 209 slides. These subsets served as a basis for constructing separate art differential instruments for trained and untrained observers' use in subsequent analyses. The second objective was achieved by having 48 trained and 48 untrained observers rate 24 color slides of paintings on 50 scale art differential instruments. Trained and untrained observers' art differential ratings of the 24 paintings were factor analyzed in order to identify the major affective factors associated with the paintings. For the trained observers, these were: aesthetic-evaluative, dynamism, emotive, and structural-organization. For the untrained, the factors were: aesthetic-evaluative, potency, and emotive. (Author/CK)

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IDENTIFICATION AND EVALUATION OF TRAINED AND UNTRAINED OBSERVERS' AFFECTIVE RESPONSES TO ART OBJECTS

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Urbana, Illinois

March 1971

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Abstract

The objectives of this study were twofold: (1) to empirically identify and analyze trained and untrained observers' affective responses (adjective qualifiers) to a representative collection of paintings for the purpose of constructing art differential instruments; and, (2) to use these instruments to objectively identify and evaluate the major affective factors and components associated with selected paintings by trained and untrained observers.

The first objective was accomplished by having 120 trained observers and 120 untrained observers elicit a universe of 12,450 adjective qualifiers to a collection of 209 color slides of paintings. The paintings were selected to represent the major style periods in the history of Western painting from the Gothic through the Twentieth Century. These data were analyzed by computerized procedures according to frequency, diversity and independence criteria. These analyses yielded subsets of adjective qualifiers most characteristic of trained and untrained observers' affective decoding of the 209 color slides. These subsets served as a basis for constructing separate art differential instruments for trained and untrained observers use in subsequent analyses.

The second objective was achieved by having 48 trained and 48 untrained observers rate 24 color slides of paintings on 50 scale art differential instruments. The 24 paintings were selected to represent a simplified style continuum ranging from representational through semi-abstract to non-objective across various painting techniques, subject matter, and chronology. Trained and untrained observers' art differential ratings of the 24 paintings were factor analyzed in order to identify the major affective factors and components associated with the 24 paintings. In these analyses the affective behavior of trained observers was characterized by four main factors: Aesthetic-Evaluative, Dynamism, Emotive, and Structural-Organizational, in order of importance. Untrained observers' affective behavior was characterized by three main factors: Aesthetic-Evaluative, Potency and Emotive, in order of importance.

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CHAPTER 1

INTRODUCTION

1.1 Research Orientation

The recent funding by the United States Office of Education of several empirically oriented pilot projects in the area of affective behavior in the arts attests to the growing interest among educators in developing means for rigorously evaluating various aspects of this highly complex and frequently unobtrusive dimension of human behavior.

While many fruitful approaches may be taken to objectively study affective behavior in the arts, the present study is limited to evaluating those features of affective behavior which can be brought into the realm of scientific investigation by use of the Semantic Differential Technique. Four research oriented factors influenced the principal investigator's decision to select this graphic rating technique for use in this study:

1. Its empirically established value and sensitivity in studying certain significant components of affective behavior.
2. Its theoretical foundation in contemporary S/R Mediation Theory.
3. Its impressive construct validity which has been demonstrated in a wide variety of pancultural research applications.

4. Its flexibility and practical efficacy as a research tool.

The presence of Professor Charles Osgood, the originator of this technique, and the availability of highly sophisticated computerized procedures for processing semantic differential data at the Urbana campus of the University of Illinois were secondary considerations which influenced the selection of this research tool.

1.2 The Effect of Training on Observers' Affective Responses to Works of Art

In order to tap the effect which formal training in the arts has on shaping affective behavior, as measured by the Semantic Differential Technique, an important distinction was made by this study regarding the acquisition and structure of trained and untrained subjects' affective behavior.

From both anecdotal art classroom observation and more formally structured observation (10), it appears that the affective responses associated with works of art by trained observers, i.e., observers with extensive formal training in studio art, aesthetics, and art history, are more consistent and homogeneous than those responses made by untrained observers, i.e., observers with no formal training in art. Specifically, trained observers, as a result of similar formal learning experiences in art, seem to have an idiosyncratic language structure with shared components which mediates their verbal expression of affect or emotion to works of art.

From the orientation presented here, when trained observers respond to paintings affectively using the verbal channel of communication, for example, there is a translation of experience gained through the visual modality into the affective or emotional modality and finally into the verbal modality. This crossmodal stimulus equivalence is learned in a way which parallels that of metaphor in language. Of course, untrained observers also make verbal responses to paintings which are affective, but without formal learning experiences in art, their responses tend to be more general and random than the responses of trained observers.

To explicate this conception of the difference between the affective behavior of trained observers and untrained observers, it may be helpful to briefly illustrate the behavior of a trained observer by use of a hypothetical construct drawn from contemporary learning theory; in particular, the two stage representational mediation model developed by Osgood and his associates (29). An art object or significate (S), such as Pollock's painting "49-9", is shown to a trained observer and elicits a complex pattern of total behavior (R_t) which is cue producing. That is, it elicits a label (s) such as Abstract Expressionism. Associated with this label are a number of other responses (r_m)

which are primarily affective, and represent some distinctive portion of the total object behavior. For example, Abstract Expressionism is active, expressive, emotional, symbolic, immediate, spontaneous, evolving, personal, undefined and so forth. These responses which are also cue producing (s_m), together (r_m-s_m), in various complex combinations of reciprocally antagonistic components, form the trained observers' affective reaction system and mediate a variety of overt adaptive acts (R_x), such as making appropriate verbal responses to the Pollock painting.

As a consequence of prior formal learning experiences in art, it could be hypothesized that the trained observer would: (1) more uniformly use the term Abstract Expressionism for labeling appropriate art objects; (2) share certain distinctive combinations of affective responses to the label Abstract Expressionism; and, (3) use these affective combinations in a similar way to mediate overt acts which take account of the particular art object.

From this point of view the untrained observer would exhibit considerably different behavior toward the same art object. For example: (1) The label Abstract Expressionism would probably not be associated with the art object; (2) the affective responses which are elicited would more than likely be related to general perceptual cues such as the color or content of the art object; and (3) the mediation effect which these responses would have on overt behavior would be negligible.

Obviously Osgood's mediation model is 'loaded' with implications about observer behavior which could easily be reduced into a series of formal hypotheses for direct testing by this study. However, due to the openness suggested by a pilot project, the researcher did not see any particular advantage in proposing such hypotheses. The reader interested in the mediation model is referred to Osgood (29), and Parts I and II of Snider and Osgood (34) for further discussion.

It should be noted that the hypothetical (r_m-s_m) reaction system described above is in principle observable via the Semantic Differential Technique. The measurement model, its development and application in the area of arts education will be discussed in the next sections of this chapter.

1.3 The Development of the Semantic Differential Technique

The Semantic Differential Technique is a potentially powerful research tool for quantitatively studying certain very significant dimensions of affective behavior. Briefly, this technique, which is hypothetically isomorphic with the reciprocally antagonistic (r_m-s_m) affective reaction system postulated by Osgood's mediation model, combines association and scaling procedures and is based on the pervasive positive-negative dimension of qualifying human experience via language behavior. The actual semantic differential instrument consists of a series of seven-step bipolar adjective scales empirically chosen from a universe of such scales representing (r_m) components appropriate for a particular research purpose. In this study the (r_m) components were objectively selected to represent the salient affective language characteristics (adjective qualifiers) associated with works of art (paintings) by trained and untrained observers.

In addition to meeting previously stated selection criteria, the use of this technique for studying certain affective properties of works of art can readily be understood from a more or less intuitive point of view by noting that the semantic differential had its origin in studies of color-music synesthesia. Synesthesia is a term defined psychologically as a phenomenon characterizing the experience of certain individuals in which sensations belonging to one sense or mode become associated with sensations of another sense or mode and appear regularly whenever a stimulus of the latter mode occurs (29). In a series of experiments, Karwoski, Odbert and their associates investigated the relationship between synesthesia, thinking, and language in general. Results from these studies indicated that stimuli from several different modalities, e.g., visual, auditory, emotional and verbal, may have equivalent or shared meanings.

Further experiments with synesthete and non-synesthete subjects indicated that perception of these cross-modal equivalences was not restricted to synesthetes but instead represented modes of translation implicit in the language of our culture. In one such experiment, 100 randomly selected college sophomores were given a purely verbal metaphor test in which the auditory-mood and visual-spatial characteristics observed in earlier experiments with synesthetes were translated into adjectives and presented as pairs, e.g., LOUD-SOFT; SMALL-LARGE. These were combined in all possible ways and judged. The relationships indicated in previous studies by complex synesthetes were regularly chosen by the randomly selected college subjects. For example, ninety-six percent of these subjects linked LOUD (an auditory mood) with LARGE (usually a spatial characteristic) (17).

From these studies it seemed clear that imagery found in synesthesia was intimately tied up with language and metaphor and that both represented semantic relationships. Karwoski, Odbert, and Osgood summarized their work with the statement that:

> . . . the process of metaphor in language as well as in color-music synesthesia can be described as the parallel alignment of two or more dimensions of experience, definable verbally by pairs of polar adjectives, with translations occurring between equivalent portions of the continua (29).

In a subsequent study of social stereotypes, Osgood and his associates made the idea of a continuum between polar adjectives explicit by placing a seven-step scale between the polar terms.

This served to increase the sensitivity of the adjectives since the subject could indicate both the direction and the intensity of each judgment. A series of bipolar adjective scales was used to measure certain affective (emotive) characteristics of particular social concepts, such as PACIFIST, RUSSIAN, DICTATOR, and NEUTRALITY. The test was set up as follows:

PACIFIST: Kind____:____:____:____:____:____:____:Cruel

The subjects were instructed to check that position on the scale which best represented the direction and intensity of their feelings about a particular social concept. The concepts and scales related in the successive items of the test were randomized to insure as much independence of judgment as possible. This study demonstrated the feasibility and efficiency of using this graphic rating technique to record the affective meanings of a set of social labels.

From the methodological point of view, an even more important observation was made by Osgood. The various descriptive scales used by the subjects in making their judgments fell into highly intercorrelated clusters. Fair-unfair, high-low, kind-cruel, valuable-worthless, Christian-antiChristian, and honest-dishonest were all found to correlate .90 or better. This type of descriptive cluster represented a general factor in social judgments which Osgood labeled the evaluative (good-bad) dimension. Terms like strong-weak, realistic-unrealistic, and happy-sad were independent of this evaluative dimension and pointed to the existence of other dimensions. In order to represent these still undefined dimensions, Osgood and his associates factor analyzed a total of fifty descriptive scales according to frequency data from previous experimentation. Twenty varied concepts were judged on these scales, yielding a thousand item test (fifty descriptive scales times twenty concepts). One hundred college students served as subjects. The subjects indicated the intensity of their feeling by the extremeness of their rating on the seven-step scales.

Factor analysis and factor rotation of these data resulted in the reduction of the fifty scales to three basic affective dimensions or factors: (1) Evaluation: good-bad; (2) Potency: strong-weak; (3) Activity: active-passive (29).

There were other dimensions which were somewhat independent of evaluation, potency and activity, but these three dimensions were the most general and salient. This suggested that the basic affective characteristics of any concept correspond to its position on these three dimensions; that is, how evaluative, potent or active a concept is perceived to be.

The evaluative dimension is strongly connected with an established psychological process: the satisfying, rewarding or reinforcing property of a stimulus (or conversely the displeasing, punishing or nonreinforcing property of a stimulus). Thus the concept of any class of stimuli includes an assessment of its average reward value; how good or how bad a stimulus is perceived to be. The potency dimension is connected with an expression of the resistance or power that is represented by a stimulus; how weak or how strong a stimulus is perceived to be. The activity dimension has to do with the rapidity of movement of a stimulus; how active or how passive a stimulus is perceived to be.

As might be expected, the Semantic Differential Technique has been thoroughly studied in terms of usual reliability and validity criteria. Briefly, test-retest reliability coefficients reported by Tannenbaum (36), Jenkins (16) and Osgood (29) represent an impressive range from .85 to .97. Since its origin, several validity studies have been made which provide convincing construct validity for this technique in a wide range of cross-cultural developmental and experimental research applications. The reader interested in validity studies of the Semantic Differential Technique is referred to Part IV of Snider and Osgood (34) for further explication.

It is interesting to note that the evaluation, potency and activity components of affective behavior identified by Osgood have a marked similarity to the three dimensions of feeling and emotion (pleasantness-unpleasantness, tension-relief, and excitement-quiet) identified by Wundt (39) nearly seventy-five years ago. In addition, more recent studies of communication via facial expression by Schlosberg (32,33) have yielded similar affective dimensions (pleasantness-unpleasantness, rejection-attention, and activation-sleep).

More than 1000 applications of the Semantic Differential Technique, in a wide variety of pancultural research situations have been reported during the past decade (34). Results from these studies have consistently supported the sensitivity and flexibility of this technique as well as the universality of its major components, evaluation, potency, and activity, as salient characteristics of the human affective system.

1.4 The Application of the Semantic Differential Technique in Arts Education Research

The Semantic Differential Technique has been used with increasing frequency in recent years for various research purposes in the area of arts education. Studies using this technique have been reported by Accurso (1), Beittel (3,4), Canter (5), Choynowski (6), Hardiman (11), Hershberger (12), Neperud (22), Powell (30), and Springbett (35). While this promising technique appears to be gaining momentum in arts education research, few large scale studies have been reported which empirically identify and analyze the universe of affective responses (adjective qualifiers) most characteristic of a particular class of stimuli as a basis for constructing semantic differential instruments for subsequent research.

A general criticism of much of the semantic differential research which has been reported in the area of arts education is that the selection of the all-important qualifier scales has been based on apriori or intuitive criteria rather than empirical criteria. An exception to this criticism, despite certain methodological deficiencies, is a study reported by Tucker (37). This study attempted to objectively identify a cluster of affective responses associated with abstract and representational paintings by artists and non-artists and is of particular interest to the present study.

Tucker obtained adjective qualifiers for semantic differential use from spontaneous comments made by art students and non-art students when viewing a large number of slides of paintings; from the comments made by visitors to an art exhibition; and from previous factorial work done by Osgood and his associates.

Using data from these sources, Tucker compiled a forty scale semantic differential which he used to investigate the affective factor structures of artists' and non-artists' ratings of seven representational (realistic) and four abstract paintings. The eleven paintings chosen for stimuli were presented on slides to ten artists and thirty-three non-artists. The subjects were allowed one minute to view the paintings before making their ratings on the semantic differential scales.

In factor analyzing all eleven paintings, the three major factors which Osgood found for describing the affective dimensions of verbal concepts, i.e., evaluation, potency, and activity, were isolated by Tucker for describing the affective factor structure of paintings. In a separate analysis of the ratings of representational paintings an even closer approximation to Osgood's factors for verbal concepts was found for both artists and non-artists.

However, when ratings of abstract paintings were factor analyzed separately, artists and non-artists displayed completely different factor structures. In their ratings of abstract paintings artists indicated a single overwhelming evaluative factor. This suggested that artists as the result of their training had a specialized language structure which mediated their affective responses to abstract paintings.

Conversely, the factor structure for non-artists' ratings of abstract paintings was quite different from the artists. Tucker described the result of these analyses as semantic chaos, indicating that there was very little apparent regularity in non-artists' ratings of abstract painting. This suggested that the non-artists had no frame of reference or language structure to mediate their affective responses to abstract paintings.

The results of the Tucker study support the distinction made by the present study regarding differences in the affective behavior of trained and untrained observers. However, in evaluating these results the reader should keep certain methodological limitations in mind.

In Tucker's study the paintings used as stimuli for eliciting the adjective qualifiers were not clearly defined and probably not representative of the various styles and subject matter found in the history of painting. Further, since the artists' and non-artists' adjective qualifiers were not obtained systematically, it is likely that the sample of adjective qualifiers used in constructing the semantic differential was not fully representative of the universe of affective responses elicited by paintings. Also the method of elicitation did not enable the investigator to obtain indices of adjective qualifiers that would differentiate between the kind of affective responses associated with paintings by artists and non-artists.

1.5 Research Objectives

The objectives of this study were twofold: (1) to empirically identify and analyze trained and untrained observers' affective responses (adjective qualifiers) to a representative collection of paintings for the purpose of constructing semantic differential instruments; and, (2) to use these instruments to objectively identify and evaluate the major affective factors and components associated with selected paintings by trained and untrained observers.

In order to differentiate the specific research instruments developed and tested by this study, the label _Art Differential Instrument_ was substituted for _Semantic Differential Instrument_ in the remaining sections of this report.

CHAPTER 2

RESEARCH DESIGN AND PROCEDURES

2.1 Research Design

In accordance with the research objectives stated in the preceding chapter, the design of this study was divided into two distinct phases: Phase I, the elicitation and analysis of a universe of characteristic affective responses (adjective qualifiers) to a representative collection of paintings for the purpose of constructing Art Differential Instruments for both trained and untrained observers; and Phase II, the analysis of trained and untrained observers' Art Differential ratings of selected paintings for the purpose of identifying and evaluating the salient factors and components of affective meaning.

2.2 Phase I

Phase I describes in detail the subjects, the stimuli, the procedures for eliciting and analyzing adjective qualifiers, and the procedures for constructing the Art Differential Instruments used in subsequent analyses.

2.21 Subjects

The subjects used in Phase I of this study consisted of 120 trained observers, 31 males and 89 females, and 120 untrained observers, 51 males and 69 females. The subjects were drawn from students at the University of Illinois, Illinois State University, and the Ohio State University.

Table 1 shows the distribution of the observers by training level and year in school.

TABLE 1

DISTRIBUTION OF OBSERVERS BY TRAINING LEVEL AND YEAR IN SCHOOL

Observer	Freshman	Sophomore	Junior	Senior	Graduate
Trained Observers (N=120)	-	-	49	47	24
Untrained Observers (N=120)	35	30	25	20	10

The trained observers were juniors, seniors and graduate students enrolled in degree programs in art, art history, or art education. Untrained observers represented a wide variety of curricula other than art and included only those observers with less than 10 semester hours of formal training in art.

2.22 Stimuli

The stimuli used in Phase I of this study consisted of 209 color slides of paintings. In selecting these paintings an attempt was made to adequately represent transitional, marginal and classical solutions for each of the major style periods in the history of Western painting from the Gothic through the Twentieth Century. The size of this collection was necessarily limited to approximately 200 paintings due to operational considerations. Table 2 presents a summary of the style periods, the number of paintings selected to represent each style period, and the style code used later in Table 4 to identify the specific paintings which have been assigned to each of the 14 style periods.

TABLE 2

SUMMARY OF STYLE PERIODS, STYLE CODE AND THE NUMBER OF PAINTINGS SELECTED TO REPRESENT EACH STYLE PERIOD

Style Period	Style Code	Number of Paintings
Gothic	1	7
International Gothic	2	3
Early Renaissance	3	23
High Renaissance	4	20
Mannerism	5	7
Baroque	6	31
Rococo	7	12
Neo-Classicism	8	5
Romanticism	9	12
Realism	10	6
Impressionism	11	6
Post Impressionism	12	13
Neo-Impressionism	13	4
Twentieth Century	14	60
		209 Total

The initial referent for selecting the paintings for this study was the List of Monuments compiled by Vickers for teaching art in its historical context (7). Of the 300 monuments identified by Vickers, approximately 130 represented paintings from the late Gothic to the midtwentieth century. Fifty-five paintings from the Vickers' collection were used in Phase I of this study. Additional paintings were identified in those areas judged by the researcher to be under-represented by the Vickers' list. This was especially true of the 17th century in Italy and the 18th and 20th centuries generally. Table 3 shows the difference between the paintings identified by Vickers and those identified by the present study according to the number of paintings selected to represent each of the style periods.

TABLE 3

DIFFERENCES BETWEEN VICKERS' LIST OF PAINTINGS AND HARDIMAN'S LIST OF PAINTINGS ACCORDING TO THE NUMBER OF PAINTINGS SELECTED TO REPRESENT EACH STYLE PERIOD

Style Period	Vickers	Hardiman	Differences
1. Gothic	3	7	+ 4
2. International Gothic	1	3	+ 2
3. Early Renaissance	17	23	+ 6
4. High Renaissance	16	20	+ 4
5. Mannerism	3	7	+ 4
6. Baroque	25	31	+ 6
7. Rococo	7	12	+ 5
8. Neo-Classicism	4	5	+ 1
9. Romanticism	8	12	+ 4
10. Realism	4	6	+ 2
11. Impressionism	6	6	0
12. Post-Impressionism	12	13	+ 1
13. Neo-Impressionism	2	4	+ 2
14. Twentieth Century	22	60	+38
Totals:	130	209	

The sizeable increase in the number of paintings selected to represent the Twentieth Century in the present study indicates the researcher's attempt to more adequately tap the widely divergent and frequently appearing movements in Twentieth Century painting. A special attempt was made to include contemporary developments such as Pop, Op, Minimal, etc. It will be noted in Table 4 that of the sixty paintings assigned to the Twentieth Century style period, approximately thirty have been selected to represent the period from 1945 to 1965.

In order to assess the content validity of the researcher's selection and assignment of paintings to the various style periods, a list of the paintings tentatively identified for use in Phase I of this study was submitted to several art historians for detailed analysis. (See the Appendix for a sample of the instructions sent to art historians.) Briefly, the half dozen art historians who generously participated in this logically oriented assessment of validity, including Professor Vickers, agreed, with few minor additions, deletions, and substitutions, that the list submitted to them adequately represented the major style periods in the history of Western painting from the Gothic through the Twentieth Century. Table 4 identifies in chronological order the artist, title and location of the 209 paintings finally selected for use as stimuli in Phase I of this study. In addition, Table 4 indicates in Column A the style period to which each painting was assigned (see Table 2 for style code), and in Column B the paintings which were retained from the Vickers' list.

TABLE 4

CHRONOLOGICAL LISTING OF THE 209 PAINTINGS USED AS STIMULI IN PHASE I OF THE HARDIMAN ART DIFFERENTIAL STUDY

	DATE	ARTIST	TITLE AND LOCATION	A	B
1	1229-59	Giunta Pisano	Crucifix, S. Domenico, Bologna	1	
2	1272-75	Cimabue	St. Trinita Madonna, Uffizi	1	
3	1305	Giotto	Flight Into Egypt Scrovegni Chapel, Padua	1	X
4	1308-11	Duccio	Annunciation of the Death of the Virgin, Cathedral Museum, Sienna	1	X
5	1315	Martini	Maestra (Detail of the Virgin and Child), Palazzo Publico, Sienna	1	
6	1337-39	Ambrogio Lorenzetti	View of a City, from the "Good and Bad Governments", Town Hall, Sienna	1	X
7	1370	Unknown	"Farming in a Good Democracy" from Aristotle's Politics, Department of Manuscripts, Royal Library of Belgium	1	
8	1413-16	Limbourg Brothers	Tres Riches Heures (Oct.), Musee Conde, Chantilly	2	X
9	1423	Gentile Da Fabriano	Adoration of the Magi, Uffizi	2	
10	1425	Masaccio	The Trinity, S.M. Novella, Florence	3	
11	1433	J. Van Eyck	Portrait of a Man in a Red Turban, National Gallery, London	3	X
12	1435	Rogier Van Der Weyden	Descent From the Cross, Prado	3	X
13	1436	J. Van Eyck	Madonna of Cannon Van Der Paele, Musee Communale, Bruges	3	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
14	1440-45	Fra Angelico	Lamentation, Museo Di San Marco	3	
15	1441	Pisanello	Lionello D'Este, Academia Carrara, Bergamo	2	
16	1444	Conrad Witz	The Miraculous Draught of Fishes, Musee D'Art Et D'Histoire, Geneva	3	X
17	c1446	Petrus Christus	Portrait of a Young Girl, Kaiser Friedrich Museum, Berlin	3	
18	c1450-57	Andrea Del Castagno	Dante, S. Appollonia Florence	3	
19	c1451	Fouquet	Virgin and Child (Detail from the Melun Diptych), Museum, Antwerp	3	
20	c1445	Piero Della Francesca	Finding of the True Cross, Church of San Francesco, Arezzo	3	
21	1455	Ucello	Battle of San Romano, National Gallery, London	3	X
22	1455-60	Mantegna	Martyrdom of St. Sebastian, Kunsthistorisches Museum, Vienna	3	X
23	1460	Piero Della Francesca	Resurrection, Palazzo Communale, Borgo S. Sepolcro, Arezzo		
24	1460	Unknown	Avignon Pieta, Louvre	3	
25	1464-67	Dieric Bouts	The Last Supper, St. Peters, Louvain	3	X
26	1474	Leonardo	Portrait of a Lady National Gallery of Art, Washington, D.C.	4	
27	1476-78	Hugo Van Der Goes	Adoration of the Shepherds, Uffizi	3	X
28	c1480	Botticelli	Birth of Venus, Uffizi	3	X
29	c1485	G. Bellini	St. Francis in Ecstasy, Frick Collection, New York	3	X
30	N.D.	Signorelli	Flagellation, Brera Gallery Milan	3	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
31	N.D.	Carpaccio	Disputa Di S. Stefano, P. Di Brera, Milan	3	
32	1494	Perugino	Portrait of Francesca Della Opere, Uffizi	3	
33	1495	Durer	Alpine Landscape, Ashmolean Museum, Oxford	4	X
34	c1500	Bosch	Adoration of the Magi (Triptych), Prado	3	
35	c1500	Bosch	Temptation of St. Anthony, Prado	3	
36	1500	Giorgione	Madonna Enthroned, Cathedral of St. Liberale, Castelfranco	4	
37	1504	Raphael	Betrothal of the Virgin, Brera, Milan	4	
38	c1508	Giorgione	Concerto Campestre, Louvre	4	
39	1508-13	Michelangelo	The Creation of Adam, Sistine Chapel, Vatican	4	X
40	1510	Leonardo	Madonna, Child, and St. Anne Louvre	4	
41	1510	Grunewald	Crucifixion,(From the Isenheim Alter), Unterlinden Museum, Colmar	4	
42	1511	Raphael	Galatea, Farnesina, Rome	4	X
43	1517-18	Raphael	Pope Leo X, Uffizi	4	X
44	1521	Rosso	The Deposition, Pinacoteca, Volterra	5	
45	1525-28	Pontormo	The Deposition, Capponi Chapel, Florence	5	
46	1526	Durer	Apostles, Alte Pinacothek, Munich	4	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
47	1528	Altdorfer	Battle of Alexander Alte Pinacothek, Munich	4	
48	1529	Hans Baldung Grien	Vanitas Alte Pinacothek, Munich	4	
49	c1530-40	Master of Flora	The Triumph of Flora Zurich	5	
50	1531	Correggio	Danae Borghese Gallery	4	
51	1533	Holbein	Ambassadors National Gallery, London	4	
52	1536-41	Michelangelo	The Last Judgment (Detail), Sistine Chapel, Vatican	5	X
53	1538	Titian	Venus of Urbino, Uffizi	4	X
54	c1546	Bronzino	Venus, Cupid, Folly, and Time, National Gallery, London	5	
55	1559	Titian	The Entombment, Prado	4	
56	N.D.	Moroni	Portrait Bergamo Accademia, Carrara	4	
57	1568	Brueghel (elder)	The Parable of the Blind Museo Nazionale, Naples	5	
58	1568	Brueghel (elder)	The Magpie of the Gallows, Landes Museum, Darmstadt	5	
59	1573	Veronese	Feast in the House of Levi, Academy, Venice	4	X
60	1586	El Greco	Burial of Count Orgaz, Church of S. Tome, Toledo	6	X
61	1591-94	Tintoretto	Last Supper San Giorgio Maggiore, Venice	4	X
62	c1592	Caravaggio	Conversion of St. Paul, S.M. Del Popolo	6	
63	1608	El Greco	View of Toledo Met. Museum of Art, New York	6	X
64	N.A.	A. Carracci	Coronation of the Virgin Denis Magon Collection, London	6	
65	1609-10	Rubens	Rubens and Isabella Brant, Alte Pinakothek, Munich	6	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
66	1616	Rubens	Rape of the Daughters of Leucippus, Pinakothek, Munich	6	
67	1617	Domenicho	Hunt of Diana, Galleria Borghese, Rome	6	
68	1623	Hals	Yonker Ramp and His Sweetheart Met. Museum, New York	6	
69	1623	Van Dyck	Cardinal Bentivoclio, Pitti, Florence	6	
70	1628	Velasquez	Portrait of Philip IV, Prado	6	
71	1633	Zurbaran	Still-Life, Florence	6	
72	1634	Claesz	Still-Life Boymans Van Beuningen Museum, Rotterdam	6	X
73	1634-35	Velazquez	Surrender of Breda, Prado	6	X
74	1638-40	Rubens	Landscape, Kunsthistorisches Museum, Vienna	6	
75	1638-40	Poussin	Triumph of Neptune and Amphitrite, Philadelphia	6	
76	1638	Claude	Seaport, Uffizi	6	
77	c1640	La Tour	Job and His Wife, Musee Departmental Des Vosges, Epinal	6	
78	1643	L. Le Nain	Peasant Family in an Interior, Louvre	6	
79	c1650	Pietro Da Cortona	La Contineviza Di Scipione, Pitti Palace	6	
80	1650-61	Le Brun	Detail of the Hotel D'Lambert, (Hercules Gallery), Paris	6	
81	1652	Ribera	Boy with a Club Foot, Louvre	6	
82	1656	Velazquez	Las Meninas, Prado	6	X
83	1658	Rembrandt	Self-Portrait Kunsthistorisches Museum, Vienna	6	

TABLE 4 (continued)

	Date	ARTIST	TITLE AND LOCATION	A	B
84	1658	Vermeer	The Milkmaid Rijksmuseum, Amsterdam	6	X
85	1659	Poussin	Orpheus and Eurydice Louvre	6	
86	N.D.	Rosa	Landscape, National Gallery, London	6	
87	1665	Steen	St. Nicholas Day, Rijksmuseum, Amsterdam	6	X
88	1666	Rembrandt	Jewish Bride, Rijksmuseum, Amsterdam	6	
89	1670	Ruisdael	The Burst of Sunlight, Louvre	6	
90	N.D.	Van der Heyden	View of the Oudezijbs-Voorburgwal, The Hague	6	
91	1691-94	Pozzo	Glorification of St. Ignatius, Rome	6	
92	1717	Watteau	Pilgrimage to Cythere, Louvre	7	X
93	c1730-35	Chardin	The Copper Cauldrun, Paris	7	
94	1757-62	Tiepolo	Building of the Trojan Horse, National Gallery, London	7	
95	1735	Rigaud	President Gaspard De Gueidan, Musee Granet, Aix-en-Provence	7	
96	1740	Canaletto	The Basin of St. Marks on Ascension Day, National Gallery, London	7	
97	1740	Nattier	Marquise De La Ferte Imbault, Estamps-Bruce Collection, Paris	7	
98	1750-60	Guardi	Gondola on the Lagoon Poldi-Pezzoli Museum, Milan	7	
99	1754	Hogarth	Chairing the Member (from the Election Series), Soane Museum, London	7	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
100	1765	Fragonard	Bathers, Louvre	7	
101	c1775	Goya	Portrait of D. Francesco Bayevy	9	
102	1777	Vernet	The Storm, Musee Calvet, Avignon	7	
103	1781	Fuseli	The Nightmare, Private Collection, Switzerland	9	
104	1784	David	Oath of the Horatii, Louvre	8	X
105	1786	Gainsborough	The Morning Walk, National Gallery, London	7	
106	1787	Reynolds	Lord Heathfield, Governor of Gibralter, National Gallery, London	7	X
107	1793	David	Death of Marat, Musees Des Beaux-Arts De Belgique, Brussels	8	X
108	1795	Blake	Newton, Tate Gallery, London	9	
109	1796	Gros	Bonaparte at Arcola, Louvre	9	
110	1805	Prud'hon	Portrait of Empress Josephine, Louvre	8	
111	1808	Ingres	La Baigneuse De Valpincon, Louvre	8	
112	1808	Goya	The Shooting of May Third, Prado	9	X
113	1818-19	Gericault	Portrait of a Mad Woman, Musee Des Beaux Arts, Lyon	9	
114	c1820	C. D. Friedrich	Two Men Gazing at the Moon, Gemaldegalerie, Dresden	9	
115	1824	Delacroix	Massacres at Chois, Louvre	9	X
116	1828	Constable	Salisbury Cathedral, National Gallery, London	9	
117	1835-40	Corot	Cabassva House at Ville-D-Auray, Louvre	9	
118	1844	Turner	Rain, Speed, and Steam National Gallery, London	9	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
119	1849	Courbet	Funeral at Ornana, Louvre	10	
120	1855	Courbet	The Painters Studio, Louvre	10	
121	1856	Ingres	Madame Moitessier, National Gallery, London	8	
122	c1860-65	Daumier	Don Quixote and Sancho Panza, Courtald Institute	10	
123	1861	Delacroix	Lion Hunt, Art Institute, Chicago	9	
124	c1863	Daumier	The Washer Woman, Louvre	10	
125	1864	Whistler	The Golden Screen, Freer Art Gallery, Washington	11	
126	1865	Daubigny	Sunset on the River Oise, Louvre	10	
127	1866	Manet	The Fifer, Louvre	11	
128	1868	Manet	Portrait of Emile Zola, Louvre	11	X
129	1875	Pizarro	Peasant Woman With a Wheelbarrow, National Museum, Stockholm	11	
130	1876	Renoir	Le Moulin De La Galette, Louvre	12	X
131	1877	Degas	The Rehearsal, Glasgow Art Gallery	12	
132	1877	Monet	Gare S. Lazare, Louvre	11	
133	1876-77	Degas	Cafe Concert, Museum, Lyons	12	
134	1884-86	Seurat	La Grande Jatte, Art Institute, Chicago	13	X
135	1885	Van Gogh	Potato Eaters, Van Gogh Collection, Laren	10	X
136	1886	Degas	The Tub, Hillstead Museum, Farmington, Connecticut	12	
137	1887	Van Gogh	Pere Tanguy, Robinson Collection, Beverly Hills, California	12	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
138	1887-88	Seurat	Side Show, Met. Museum, New York	13	X
139	1888	Gauguin	Jacob Wrestling With the Angel, National Gallery of Scotland, Edinburgh	12	
140	1889	Van Gogh	Wheatfield and Cypresses, National Gallery, London	12	X
141	1889	Gauguin	Yellow Christ, Albright Art Gallery, Buffalo	12	X
142	1892	Toulouse-Lautrec	At the Moulin-Rouge, Art Institute, Chicago	12	X
143	1893	Vuillard	Mother and Sister of the Artist, Museum of Modern Art, New York	13	
144	1895	Munch	The Death Bed, Meyer Collection, Bergen	12	
145	1895-1900	Cezanne	Still-Life with Apples and Oranges, Louvre	12	
146	c1905	Cezanne	Mont Sainte Victore Philadelphia Museum of Art	12	
147	1907	Picasso	Les Demoiselles D'Avignon, Museum of Modern Art, New York	14	X
148	1910	Renoir	Women at the Fountain Rosenberg Gallery, New York	12	
149	1910	Rousseau	The Dream, Museum of Modern Art, New York	14	X
150	N.D.	Rouault	Old King, Carnegie Institute, Pittsburgh	14	X
151	1911	Braque	Man with a Guitar, Museum of Modern Art New York	14	
152	1911	Kandinsky	Man on a Horse, Beuningen Museum, Rotterdam	14	
153	1911	Boccioni	States of Mind I, Private, New York	14	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
154	1911	Chagall	I and My Village, Museum of Modern Art, New York	14	X
155	1911	Matisse	Moroccan Landscape National Museum, Stockholm	14	
156	1912	Duchamp	Le Passage de la Vierge a la Mariee, Museum of Modern Art, New York	14	
157	1913	Kandinsky	Sketch for Composition VII, Klee Collection, Bern	14	X
158	1915	DeChirico	Turin Melancholy, Private, Milan	14	
159	1916	Malevich	Dynamic Suprematism, Tretyakov Gallery, Moscow	14	
160	1919-25	Monet	Iris by the Pond, Art Institute, Chicago	11	
161	1919	Nolde	Masks and Dahlias, Seebull Foundation	14	
162	1921	Klee	Herbstlicher Ort, Vowinckel Collection, Koln	14	
163	1921	Leger	Petit Dejeuner, Tremaine Collection, Meriden, Connecticut	14	
164	1921	Picasso	Three Musicians, Museum of Modern Art, New York	14	X
165	1922	Klee	Twittering Machine, Museum of Modern Art, New York	14	X
166	1924	Lissitzky	Proun 99 Yale Art Gallery New Haven, Connecticut	14	
167	1925	Hopper	House by the Railroad, Museum of Modern Art New York	14	
168	1925	Picasso	Three Dancers, Collection of the Artist	14	
169	1925	Otto Mueller	Polish Family, Folkwang Museum, Essen	14	
170	1925	Matisse	A Seated Woman With an Exotic Plant, National Gallery, Washington	14	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
171	1928	Magritte	Threatening Weather, Penrose Collection, London	14	
172	1930	Mondrian	Composition with Red, Blue, and Yellow, Bartos Collection, New York	14	X
173	1930-31	Bonnard	The Breakfast Room, Museum of Modern Art, New York	13	
174	1932	Picasso	Girl Before a Mirror, Museum of Modern Art, New York	14	
175	1934	Delaunay	Rhythm S. Delaunay Collection, Paris	14	
176	1937	Beckmann	The Departure, Museum of Modern Art, New York	14	
177	1937	Picasso	Guernica, Owned by the Artist	14	X
178	1937	Braque	Woman with a Mandolin, Museum of Modern Art, New York	14	
179	1939	Picasso	Night Fishing at Antibes, Museum of Modern Art, New York	14	
180	1942-43	Mondrian	Broadway Boogie-Woogie Museum of Modern Art New York	14	X
181	1944	Matta	Le Vertice d'Eros Museum of Modern Art, New York	14	
182	1945	Shahn	Liberation, Soby Collection, New Canaan, Connecticut	14	X
183	1947	Gorky	Agony, Museum of Modern Art, New York	14	
184	1948	Tobey	Tropicalism, Fusillo Collection, Florida	14	
185	1949	Miro	Woman Bird by Moonlight, Tate Gallery, London	14	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
186	1949	Pollock	49-9, Smith Collection, South Orange, New Jersey	14	
187	1949	Still	Number 2, Heller Collection	14	
188	1950	Marin	New York at Night Rosenthal Collection New York	14	
189	1950	Tamayo	The Singer, National Museum of Modern Art, Paris	14	
190	1950	Motherwell	The Voyage, Museum of Modern Art, New York	14	
191	1950	Tomlin	Number 9, Museum of Modern Art, New York	14	
192	1951	Davis	Visa, Museum of Modern Art, New York	14	
193	1951	Giacometti	Artist's Mother, Collection Aime Maeght	14	
194	1952	de Kooning	Woman II, Museum of Modern Art, New York	14	
195	1955	Kline	Accent Grave, Cleveland Museum of Art, Cleveland	14	
196	1955	Hofmann	X-1955, Rubel Collection, New York	14	
197	1957	Rothko	White and Greens in Blue, Private, New York	14	
198	1958	de Kooning	Suburb in Havana, Uccle-Brussels	14	
199	1959	Scott	Composition 39, Galerie Charles Lienhard, Zurich	14	
200	1962	Oldenberg	Giant Blue Pants, Harris Collection, Chicago	14	
201	1963	Albers	Homage to the Square, Galerie Muller, Stuttgart	14	
202	1963	Wesselmann	Bathtub Collage, No. 3, Sidney Janis Gallery	14	

TABLE 4 (continued)

	DATE	ARTIST	TITLE AND LOCATION	A	B
203	1963	Rosenquist	1, 2, 3 and Out Bellamy Collection, New York	14	
204	1963	Vasarely	Kalota, Pace Gallery, New York	14	
205	1964	Tadasky	A-100, Museum of Modern Art, New York	14	
206	1964	Noland	And Again, Private, Seattle	14	
207	1964	Lichtenstein	As I Opened Fire, Stedelijk Museum, Amsterdam	14	
208	1965	Warhol	Four Campbell's Soup Cans, Museum of Modern Art, New York	14	
209	1965	Wesley	Squirrels, Robert Elkon Gallery, New York	14	

As might be expected, certain problems were encountered in assigning paintings to style periods. This was particularly true for Northern paintings of the 15th and 16th centuries where assignments to style periods originally formulated for Italian painting has led to much confusion. While various solutions have been offered by Janson and others, this study has simply called Northern and French paintings from the 15th century Early Renaissance. Other more specific problems related to assigning paintings to style periods included Correggio's "Danae" which has been classified as High Renaissance in this study. Michelangelo's "The Last Judgment" on the other hand has been classified as Mannerist. Paintings by Veronese and Tintoretto have been classified as High Renaissance, while El Greco, who is not uncommonly associated with Mannerism, has been classified as Baroque. Vernet's "The Storm", although atypical of French Rococo painting, represents a movement that cannot be properly discussed in any of the other traditional schools. Paintings by Fuseli and Blake have been classified as Romanticism in view of the early development of the school in England. Goya shares characteristics of several movements and has variously been called Rococo, Realist or Romantic. However, because Realism as used in this study indicates a school of painting active during the middle of the 19th century as distinct from an approach to painting, Goya's painting has been classified as Romanticism. Van Gogh's "Potato Eaters" has been classified as Realism due to its early date. Munch's "The Death Bed" has been classified as Post Impressionism although his importance as an Expressionist is well documented. Rousseau's "The Dream", usually considered as Primitive, has, for convenience and conservation of space, been classified in the more general Twentieth Century style period along with other paintings which could easily have been classified more specifically as Cubist, Surrealist, Abstract Expressionist, etc.

Color slides of the 209 paintings used as stimuli in this study were photographed by the researcher and his assistant in consultation with various members of the Art History Department of the University of Illinois.

2.23 Procedure for Eliciting Adjective Qualifiers

Color slides of the 209 paintings used as stimuli were randomized by reference to a table of random numbers. The slides were then distributed among four slide carrousels, with each carrousel containing approximately 52 slides, for use at the three data collecting sites previously identified.

Each carrousel was presented to groups of 30 trained and 30 untrained observers during 60 minute sessions by use of a 35mm slide projector. In order to maximize the opportunity for a diverse range of adjective qualifiers to be associated with the 209 slides, a different group of trained and untrained observers was used to decode each of the slide carrousels. Table 5 shows the means, standard deviations, and t-tests of mean differences between the trained and untrained observers' semester hours of training in art.

TABLE 5

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF MEAN DIFFERENCES BETWEEN TRAINED AND UNTRAINED OBSERVERS' SEMESTER HOURS OF TRAINING IN ART

OBSERVERS	MEAN SEMESTER HOURS	S.D.	t	SIGNIFICANCE
Slide Carrousel I				
Trained (N=30)	40.20	18.78		
Untrained (N=30)	2.90	1.92	10.82	.001

TABLE 5 (continued)

OBSERVERS	MEAN SEMESTER HOURS	S.D.	t	SIGNIFICANCE
Slide Carrousel II				
Trained (N=30)	39.73	6.67		
Untrained (N=30)	.30	1.19	31.89	.001
Slide Carrousel III				
Trained (N=30)	61.61	30.33		
Untrained (N=30)	1.62	2.63	10.43	.001
Slide Carrousel IV				
Trained (N=30)	59.93	25.72		
Untrained (N=30)	.97	.98	12.55	.001

Each observer was given a response booklet containing a personal history statement, instructions, and approximately 52 sequentially coded response forms for recording adjective qualifiers. See the Appendix for sample personal history statement, instructions and the response form.

After detailed instructions had been read to the observers by the researcher or his assistant, each slide was exposed on a screen in a semi-darkened room for a period of 30 seconds. During this time observers were asked to study the slide carefully but to withhold judgment. When the slide was removed from the screen observers were requested to write down the one adjective qualifier which best described their immediate feelings about the painting on the appropriately coded response form. Generally an interval of 10 seconds was adequate for this task although the length of the interval was initially adjusted to the slowest observer. The constraint to use only adjective qualifiers was implemented by instructing the observers to think of the frames: "The (adjective qualifier) painting," or "The painting is (adjective qualifier)."

2.24 Analysis of Adjective Qualifiers

The data from this phase of the study consisted of 12,540 adjective qualifiers, with 1832 different types for trained observers and 1632 different types for untrained observers, given as responses to the 209 color slides of paintings. All stimuli, adjective qualifiers and observer data were punched onto IBM cards for standardized computer analysis according to the frequency, diversity and independence indices developed by Osgood and his associates.

Briefly, the frequency index consisted of a simple count describing the number of times a specific qualifier appeared in the total of 6270 qualifiers elicited by each group of observers. The diversity or productivity index was obtained by counting the number of different stimuli to which a given qualifier was associated by each group of observers. For computation purposes both the frequency and diversity characteristics are combined into a single H-value which is equivalent to the measure of conditional entropy in information theory. To illustrate the meaning of the H-value, those adjective qualifiers elicited by a large number of observers (high frequency) to a large number of different stimuli (high diversity) have a high H-value, on the other hand, those adjective qualifiers associated with only a small number of stimuli (low diversity) by only a few observers (low frequency) have a low H-value. Both frequency and diversity indices are considered important criteria in selecting qualifiers for generalized scale useage such as the one being developed by this study because they identify salient language commonalities across a wide range of stimuli. After the qualifiers were computed and ranked according to H-value a final procedure was employed in order to minimize semantic redundancy and maximize independence among the qualifiers. For this purpose intercorrelations between the qualifiers were computed using the phi coefficient. To illustrate the meaning of the phi coefficient, if a qualifier such as OKAY is highly correlated with GOOD but GOOD has a higher H-value, then OKAY is eliminated and GOOD is retained. In other words, this procedure retains those qualifiers having the highest H-value and the lowest correlation, thus minimizing qualifier overlap and maximizing qualifier independence. For further explication of the H-value and the phi coefficient see the detailed description included in the Appendix.

Tables 6 and 7 summarize the frequency, diversity and H-value for the top 150 adjective qualifiers elicited by trained and untrained observers to the 209 color slides of paintings previously identified. In addition, qualifiers selected according to the independence criterion are indicated by an asterisk immediately following the qualifier. The reader will note that there are a number of qualifiers listed in Tables 6 and 7 which have the same H-value but different ranks. Obviously when the H-value is identical for two or more qualifiers the rank is also identical. However, the H-value identified in the original data was carried out to eight places and with few exceptions each qualifier had a different H-value. In order to save space in the present report, the H-values were rounded off to three decimal places. Thus the ranks reported in Tables 6 and 7 were the ranks indicated in the original data before rounding. Also, all correlations for the independence criterion were computed from the original data.

TABLE 6

SUMMARY OF 150 ADJECTIVE QUALIFIERS ELICITED
BY 120 TRAINED OBSERVERS TO 209 COLOR
SLIDES OF PAINTINGS

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
1	moving*	59	43	.050
2	colorful*	62	35	.047
3	interesting*	52	42	.044
4	powerful*	53	40	.044

*Qualifiers selected according to the independence criterion

TABLE 6 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
5	warm*	53	35	.042
6	good*	47	39	.039
7	emotional*	50	33	.039
8	cold*	40	30	.030
9	symbolic*	39	28	.029
10	stiff*	38	29	.029
11	flat*	39	28	.029
12	linear*	38	28	.028
13	strong*	36	27	.027
14	religious*	39	22	.026
15	sad	37	26	.026
16	bold*	35	27	.025
17	bright	34	26	.025
18	realistic	34	23	.023
19	active	35	22	.022
20	busy*	32	24	.022
21	expressive	31	25	.022
22	geometric*	38	17	.022
23	dull*	29	24	.021
24	light*	28	21	.019
25	bad*	25	25	.018
26	okay	25	24	.018
27	dramatic*	26	20	.018
28	beautiful*	25	22	.017
29	impressionistic	27	18	.017
30	peaceful*	27	18	.017
31	poor*	23	23	.017
32	rich	28	15	.016
33	soft	28	16	.016
34	dynamic*	23	21	.016
35	formal	23	20	.016
36	confusing	22	20	.015
37	exciting	22	20	.015
38	heavy*	23	18	.015
39	spatial	24	17	.014
40	nice*	21	21	.014
41	deep*	22	19	.014
42	sensual*	25	15	.014
43	patterned	24	16	.014
44	great	21	20	.014

*Qualifiers selected according to the independence criterion

TABLE 6 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
45	simple*	20	18	.013
46	symmetrical	22	15	.013
47	contrasting	22	16	.013
48	static*	21	16	.013
49	happy*	22	15	.013
50	gay	21	15	.013
51	serene*	21	15	.013
52	crowded	21	15	.013
53	detailed	21	15	.013
54	flowing	21	14	.012
55	confused	21	14	.012
56	balanced	19	16	.012
57	solemn*	18	17	.011
58	complex	19	15	.011
59	cubistic*	21	11	.011
60	stark*	18	15	.011
61	grotesque	18	14	.010
62	old*	17	15	.010
63	decorative*	19	12	.010
64	somber*	17	14	.010
65	rigid	17	13	.010
66	textural*	18	13	.010
67	strange	17	13	.009
68	mysterious	17	13	.009
69	sensitive	16	14	.009
70	painterly	16	14	.009
71	fair	15	15	.009
72	violent*	18	10	.009
73	delicate*	16	13	.009
74	abstract	16	12	.008
75	sensuous	16	12	.008
76	structured	15	13	.008
77	vibrating*	18	11	.008
78	quiet*	14	14	.008
79	dark	14	14	.008
80	weird*	14	13	.008
81	ugly*	14	13	.008
82	airy	14	12	.007
83	majestic*	13	13	.007
84	tranquil	13	13	.007

*Qualifiers selected according to the independence criterion

TABLE 6 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
85	subtle	13	13	.007
86	stylized*	14	11	.007
87	painful*	16	9	.007
88	modern	13	12	.007
89	surrealistic	16	8	.006
90	cluttered	12	12	.006
91	graphic*	12	12	.006
92	sorrowful	13	10	.006
93	earthy*	13	10	.006
94	disturbing*	12	11	.006
95	intriguing	12	11	.006
96	allegorical*	12	10	.006
97	angular	13	9	.006
98	red	12	10	.006
99	pleasant	11	11	.006
100	still	11	11	.006
101	intense	11	11	.006
102	illusionistic*	11	11	.006
103	elegant	11	11	.006
104	classical	11	11	.006
105	alive	12	9	.005
106	primitive	13	8	.005
107	regal	11	10	.005
108	mystical*	12	8	.005
109	perspective*	12	8	.005
110	romantic	12	8	.005
111	humorous	11	9	.005
112	contemporary*	10	10	.005
113	renaissance*	10	10	.005
114	glowing	12	8	.005
115	photographic*	11	8	.004
116	pretty	11	8	.004
117	historical	11	8	.004
118	frightening	10	9	.004
119	fantastic*	10	9	.004
120	lonely	10	9	.004
121	brilliant	10	9	.004
122	massive	10	9	.004
123	pathetic	10	9	.004
124	stormy	12	7	.004

*Qualifiers selected according to the independence criterion

TABLE 6 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
125	portrait-like	10	8	.004
126	chaotic	10	8	.004
127	human	10	8	.004
128	idealized*	9	9	.004
129	gloomy*	9	9	.004
130	fun*	9	9	.004
131	depressing	9	9	.004
132	dignified	9	9	.004
133	calm	9	9	.004
134	boring	9	9	.004
135	precise	9	9	.004
136	moody*	9	9	.004
137	tight	9	9	.004
138	thoughtful	9	8	.004
139	stoic	9	8	.004
140	playful	9	8	.004
141	distorted	9	8	.004
142	graceful	9	8	.004
143	gray	9	8	.004
144	foreboding	9	8	.004
145	floating	9	7	.003
146	designed	9	7	.003
147	monumental	9	7	.003
148	pensive*	9	7	.003
149	posed	8	8	.003
150	personal*	8	8	.003

*Qualifiers selected according to the independence criterion

TABLE 7

SUMMARY OF 150 ADJECTIVE QUALIFIERS ELICITED
BY 120 UNTRAINED OBSERVERS TO 209 COLOR
SLIDES OF PAINTINGS

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
1	good*	201	95	.202
2	interesting*	87	74	.085
3	dull*	88	67	.082
4	colorful*	85	60	.078
5	beautiful*	82	57	.074
6	fair	70	49	.061
7	poor*	67	51	.059
8	sad*	72	40	.058
9	religious	73	34	.055
10	detailed*	65	43	.054
11	confusing*	54	39	.044
12	bad	50	42	.042
13	simple*	50	39	.041
14	realistic	50	36	.040
15	peaceful*	49	32	.038
16	ugly*	46	33	.036
17	moving*	41	32	.032
18	bright*	46	26	.031
19	abstract	40	29	.030
20	nice*	36	34	.029
21	happy*	43	22	.028
22	modern	36	26	.026
23	excellent	33	31	.026
24	weird*	31	23	.021
25	different*	28	26	.021
26	expressive*	28	26	.021
27	warm*	30	22	.021
28	exciting*	29	23	.020
29	busy	28	23	.020
30	understanding	26	25	.019
31	pretty*	27	21	.018
32	powerful*	27	21	.018
33	great*	23	22	.016
34	lonely	22	20	.015
35	strange*	22	20	.015
36	striking*	23	18	.015

*Qualifier selected according to the independence criterion

TABLE 7 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
37	dark*	24	16	.015
38	okay	21	21	.015
39	flat	22	19	.014
40	lifelike	21	19	.014
41	gay	22	17	.014
42	emotional*	21	17	.013
43	cold	20	18	.013
44	serene	21	16	.013
45	depressing*	19	18	.012
46	crowded	20	16	.012
47	solemn	19	16	.012
48	confused*	19	15	.012
49	strong*	18	16	.011
50	boring*	18	16	.011
51	unreal*	18	15	.011
52	vivid	17	16	.011
53	lovely	17	16	.011
54	calm	18	14	.010
55	funny*	17	15	.010
56	old	17	15	.010
57	clear*	16	16	.010
58	natural*	18	13	.010
59	soft*	18	12	.010
60	plain*	16	15	.010
61	bold	16	14	.009
62	drab*	15	15	.009
63	contrasting	16	13	.009
64	rich*	16	13	.009
65	restful	15	14	.009
66	deep*	15	14	.009
67	scenic	16	12	.009
68	geometric*	17	11	.008
69	meaningful*	15	13	.009
70	mysterious*	15	13	.009
71	quiet*	15	13	.009
72	average	14	14	.008
73	stiff	15	12	.008
74	symbolic*	14	13	.008
75	intriguing*	14	13	.008
76	tragic	15	11	.008

*Qualifiers selected according to the independence criterion

TABLE 7 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
77	painful*	15	11	.008
78	odd	13	13	.007
79	terrible*	13	13	.007
80	meaningless	13	13	.007
81	disturbing*	13	13	.007
82	messy*	15	10	.007
83	stormy*	16	9	.007
84	deathlike	14	11	.007
85	dreary*	13	12	.007
86	childlike*	13	12	.007
87	real	13	12	.007
88	ancient*	13	12	.007
89	still*	13	11	.007
90	active	15	9	.007
91	dimensional	14	10	.007
92	morbid	14	10	.007
93	blah*	12	12	.007
94	typical	12	12	.007
95	delicate*	14	9	.007
96	cluttered	13	10	.006
97	angry	13	10	.006
98	complex	12	11	.006
99	frightening	12	11	.006
100	imaginative	12	11	.006
101	serious	12	10	.006
102	jumbled	12	10	.006
103	stupid*	12	10	.006
104	stately	12	10	.006
105	unrealistic*	11	11	.006
106	mediocre	11	11	.006
107	light*	11	11	.006
108	gloomy	11	11	.006
109	forceful	12	9	.005
110	unusual	12	9	.005
111	sorrowful	12	9	.05
112	eerie*	13	8	.05
113	pleasant*	11	10	.05
114	empty	12	8	.05
115	cool	11	9	.05
116	motherly*	11	9	.05
117	violent	11	9	.05

*Qualifiers selected according to the independence criteria

TABLE 7 (continued)

H-RANK	QUALIFIER	FREQUENCY	DIVERSITY	H-VALUE
118	ornate	11	9	.005
119	ridiculous	10	10	.005
120	harsh*	10	10	.005
121	formal*	10	9	.004
122	posed	10	9	.004
123	thoughtful*	10	9	.004
124	majestic	11	7	.004
125	fantastic	10	8	.004
126	pure*	10	8	.004
127	somber	10	8	.004
128	sensual	10	8	.004
129	cheerful	10	8	.004
130	fascinating	9	9	.004
131	intricate*	9	9	.004
132	flowing*	9	9	.004
133	homey	11	7	.004
134	hopeful	10	8	.004
135	humble	9	8	.004
136	linear	9	8	.004
137	chaotic	9	8	.004
138	relaxing	9	8	.004
139	pitiful	9	8	.004
140	vague	9	8	.004
141	loving	11	7	.004
142	common*	9	7	.004
143	earthy*	9	7	.004
144	creative	8	8	.004
145	dramatic	8	8	.004
146	dignified	8	8	.004
147	unique	8	8	.004
148	wild	8	8	.004
149	inspiring*	8	8	.004
150	pleasing*	8	8	.004

*Qualifiers selected according to the independency criterion

A cursory analysis of Tables 6 and 7 reveals that the highest ranking qualifiers elicited by trained observers were representative of the various evaluative, potency and activity modes of qualifying experience previously identified by Osgood and others (e.g., moving, powerful, good, strong, interesting, active, etc.). On the other hand, the highest ranking qualifiers elicited by untrained observers were primarily representative of the evaluative mode of qualifying experience (e.g., good, interesting, fair, poor, bad, beautiful, etc.). This observation reflects the well-established fact in semantic differential research that evaluation is the dominant mode of qualifying experience for heterogenous groups.

To summarize, Tables 6 and 7 identify the subsets of adjective qualifiers which were most characteristic and representative of trained and untrained observers' affective decoding of the 209 color slides of paintings used as stimuli in Phase I of this study. These subsets of qualifiers, empirically reduced by computerized procedures from a total sample of 12,540 qualifiers, served as the basis for constructing the bipolar scales used in subsequent art differential analyses.

2.25 Opposite Elicitation and Construction of Art Differential Instruments

Results from the H (frequency and diversity) and phi (independence) analyses yielded a subset of 66 adjective qualifiers for trained observers and a subset of 75 adjective qualifiers for untrained observers. Randomized lists of these qualifiers were submitted to small groups of approximately 25 trained and 25 untrained subjects (juniors, seniors, and graduate students at the University of Illinois) for use as stimuli in eliciting verbal opposites for scale production according to standardized procedures. Instructions for the opposite elicitation task can be found in the Appendix. Forty-nine qualifiers from the trained subset and 46 qualifiers from the untrained subset received an opposite with an acceptable level of agreement. An opposite was considered to be acceptable if it was elicited by 13 or more of the 25 subjects representing each group. In most cases one opposite clearly appeared most frequently for each qualifier but a few qualifiers had to be retested with other groups of subjects. It is worth noting at this point that the randomized lists contained several qualifiers which were obvious opposites, e.g., good-bad, beautiful-ugly, moving-still, dynamic-static, etc. In addition, opposites for other qualifiers on the randomized lists were included in Tables 6 and 7 but were not selected by the independence criteria, e.g., painterly-graphic, rich-poor, happy-sad, gloomy-bright, etc.

In order to round out the qualifier scales to an even 50 for each group of subjects a few control scales representing primarily non-evaluative modes of qualifying experience were added to each group of scales. This analysis yielded a separate art differential instrument for trained and untrained observers, with each instrument being composed of 50 seven-step bipolar adjective qualifier scales. In order to offset response bias, qualifier scales representing each group were randomized and alternated in polarity and reproduced in the usual graphic form on legal size white mimeograph paper. The art differential scales used to collect data in Phase II of this study are shown in Tables 8 and 9.

TABLE 8

ART DIFFERENTIAL SCALES FOR TRAINED OBSERVERS

Powerful	Powerless
Still	Vibrating
Grotesque	Elegant
Non-Aesthetic	Aesthetic*
Fuzzy	Clear
Concrete	Mystical
Emotional	Non-Emotional
Heavy	Delicate
Personal	Impersonal
Organic	Geometric
Detailed	Simple
Gay	Solemn
Quiet	Noisy
Painless	Painful
Bold	Meek
Heavenly	Earthy
Stylized	Non-Stylized
Explosive	Serene
Moving	Still

*indicates control scales

TABLE 8 (continued)

Non-Sensitive	Sensitive
Dynamic	Static
Light	Heavy
Majestic	Lowly
Non-Textural	Textural
Disturbing	Pleasing
Stiff	Loose
Plain	Decorative
Interesting	Uninteresting
Massive	Linear
Idealized	Non-Idealized
Depressing	Uplifting
Simple	Complex
Dark	Light
Sensual	Non-Sensual
Ugly	Beautiful
Warm	Cool
Uninvolved	Involved
Stark	Lush
Disorganized	Organized
Graphic	Painterly
Rich	Poor
Deep	Shallow

TABLE 8 (continued)

Weak	Strong
Good	Bad
Violent	Peaceful
Weird	Ordinary
Non-Symbolic	Symbolic
Colorful	Drab
Sad	Happy
Gloomy	Bright

TABLE 9

ART DIFFERENTIAL SCALES FOR UNTRAINED OBSERVERS

Hard	Soft
Smooth	Rough*
Thoughtless	Thoughtful
Non-Aesthetic	Aesthetic*
Impure	Pure
Pleasant	Unpleasant
Exciting	Blah
Relaxing	Tense
Informal	Formal
Tasteful	Tasteless*
Cheerful	Depressing
Warm	Cold
Stupid	Clever
Colorful	Drab
Disturbing	Comforting
Dreary	Bright
Meaningless	Meaningful
Symbolic	Non-Symbolic
Calm	Stormy
Common	Uncommon
Heavenly	Earthy

*indicates control scales

TABLE 9 (continued)

Powerful	Powerless
Dull	Exciting
Interesting	Uninteresting
Happy	Sad
Delicate	Heavy
Wonderful	Terrible
Deep	Shallow
Still	Moving
Strange	Familiar
Bad	Good
Painful	Soothing
Real	Unreal
Emotional	Unemotional
Fancy	Plain
Strong	Weak
Neat	Messy
Dark	Light
Chaotic	Peaceful
Inspiring	Uninspiring
Quiet	Noisy
Expressive	Unexpressive
Same	Different
Poor	Rich
Small	Great

TABLE 9 (continued)

Simple	Complex
Unfriendly	Friendly*
Confusing	Clear
Unnatural	Natural
Ugly	Beautiful

*indicates control scales

2.3 Phase II

Phase II describes in detail the subjects, the stimuli and the procedures for collecting and factor analyzing the art differential data.

2.31 Subjects

The subjects used in Phase II of this study consisted of 48 trained observers, 24 males and 24 females, and 48 untrained observers, 24 males and 24 females. All of the subjects who participated in Phase II were students at the University of Illinois Urbana campus. Table 10 shows the distribution of the subjects by training level and year in school.

TABLE 10

DISTRIBUTION OF SUBJECTS BY TRAINING LEVEL AND YEAR IN SCHOOL

OBSERVERS	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	GRADUATE
Trained (N=48)	-	-	14	22	12
Untrained (N=48)	15	13	11	6	3

The trained observers were juniors, seniors and graduate students enrolled in degree programs in either art, art history or art education. Untrained observers were drawn from a wide variety of curricula other than art. All subjects were given a five dollar honorarium for participating in this phase of the study. Table 11 shows the means, standard deviations, and t-tests of mean differences between trained and untrained observers' semester hours of training in art.

TABLE 11

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF MEAN DIFFERENCES BETWEEN TRAINED AND UNTRAINED OBSERVERS' SEMESTER HOURS OF TRAINING IN ART

OBSERVERS	MEAN SEMESTER HOURS	S.D.	t	SIGNIFICANCE
Trained (N=48)	69.12	23.63		
Untrained (N=48)	1.50	3.14	19.63	.001

2.32 Stimuli

The stimuli used in Phase II of this study consisted of 24 color slides of paintings. These slides were selected from among the 209 slides used as stimuli in Phase I. Due to operational considerations, the number of paintings selected for use as stimuli in Phase II was limited to 24.

In order to assure maximum differentiation in the art differential ratings made by trained and untrained observers the paintings were selected by the researcher to define a simplified style continuum ranging from representational or realistic through semi-abstract to non-objective. In selecting paintings to represent these style categories an attempt was made to include a wide range of subject matter, painting techniques and chronology. Thus paintings selected for the representational style included both a portrait by Pisanello done in 1441 and a landscape by Hopper done in 1925. The non-objective style included both a soft edge action painting by Kline done in 1955 and a hard edge, optical painting by Vasarely done in 1963. The paintings selected for use as stimuli in Phase II of this study are identified in Table 12.

In order to assess the construct validity of the researcher's style classification of the 24 paintings, painting by scale factor analyses were run on the trained and untrained observers' art differential data. Briefly, results from these analyses yielded three clear factor structures for trained and untrained observers, with factorial components which closely corresponded to the researcher's classifications. While the dominance of these factors varied somewhat for trained and untrained observers, the factor structures remained essentially the same for both observer groups. Tables 23 and 24, which summarize the results of these analyses, can be found in the Appendix.

TABLE 12

LIST OF 24 PAINTINGS USED AS STIMULI IN PHASE II OF THE HARDIMAN ART DIFFERENTIAL STUDY

DATE	ARTIST	TITLE
	Representational Style (N=8)	
1441	Pisanello	Lionello D'Este
1546	Bronzino	Venus, Cupid, Folly, and Time
1658	Rembrandt	Self-Portrait
1670	Ruisdael	The Burst of Sunlight
1754	Hogarth	Chairing of the Member (from the Election Series)
1895-1900	Cezanne	Still-Life with Apples and Oranges
1925	Hopper	House by the Railroad
1963	Wesselmann	Bathtub Collage, No. 3
	Semi-Abstract Style (N=8)	
1844	Turner	Rain, Speed, and Steam
1895	Munch	The Death Bed
1905	Cezanne	Mont Sainte Victore
1907	Picasso	Les Demoiselles d'Avignon
1911	Chagall	I and My Village
1911	Boccioni	States of Mind I
1939	Picasso	Night Fishing at Antibes
1950	Tamayo	The Singer
	Non-Objective Style (N=8)	
1912	Duchamp	Le Passage de la Vierge a la Mariee
1913	Kandinsky	Sketch for Composition VII
1930	Mondrian	Composition with Red, Blue, and Yellow
1942-43	Mondrian	Broadway Boogie-Woogie
1949	Pollock	49-9
1955	Kline	Accent Grave
1957	Rothko	White and Greens in Blue
1963	Vasarely	Kalota

2.33 Procedures for Collecting Art Differential Data

Color slides of the 24 paintings used as stimuli in Phase II were randomized and placed in a slide carrousel for presentation to groups of trained and untrained observers. Since rating all 24 slides at one sitting would be a tiresome task and thus contribute to unreliable or perfunctory ratings, the slides were rated during two one hour sessions with 12 slides being shown at each session.

The procedure for showing the slides was essentially the same as described in Phase I of this study. Each observer was given a response booklet containing a personal history statement, instructions and a 50 scale art differential for each stimuli. See the Appendix for sample personal history statement, instructions and art differential instruments.

After detailed instructions had been read to the observers by the researcher or his assistant each slide was exposed on the screen in a semi-darkened room for the entire length of time required by the slowest observer to rate the slide on all 50 qualifier scales. Usually the slides were visible on the screen for approximately four minutes. Subjects were instructed to study each painting carefully for the first minute or so before making rating decisions which best described the intensity of their immediate feelings about the painting on the art differential scales.

2.34 Procedures for Factor Analyzing Art Differential Data

The basic input for the factor analytic procedures used in

Phase II of this study consisted of ten 50x50 interscale correlation matrices, five matrices for trained observers and five matrices for untrained observers. Initially, the principal components factorial method, employing the least-squares principle, was applied to each of the correlation matrices generated by this study. The factors extracted from this analysis, usually five to nine, were then rotated by use of the varimax factor routine. This procedure redistributes the factor matrix variance so that the matrix approaches an orthogonal configuration. A detailed description of the various computer programs used in this phase of the study can be found in the Appendix.

CHAPTER 3

RESULTS AND CONCLUSIONS

3.1 Concept of Scale Factorizations for Trained and Untrained Observers

The following discussion is restricted to the results of the main analysis of trained and untrained observers' varimax factor structures for the total set of 24 paintings. Additional analyses were made for the subsets of paintings assigned to the Representational, Semi-Abstract and Non-Objective style categories. Tables summarizing the factorial structure of these style categories appear in the Appendix. The full set of data for Phases I and II of this study is on file with the Ricker Arts Library at the University of Illinois Urbana campus.

3.11 Results for Trained Observers

Table 13 summarizes the major scales associated with eight varimax factors based on 48 trained observers' mean art differential ratings of 24 color slides of paintings. On the basis of the scales with the highest loadings, the dominant factors reported in Table 13 were defined as follows: Factor I, Dynamism (violent-peaceful, explosive-serene, dynamic-static, moving-still, vibrating-still, noisy-quiet); Factor II, Emotive (sad-happy, gloomy-bright, solemn-gay, depressing-uplifting, and heavy-light); Factor III, Structural-Organizational (clear-fuzzy, stiff-loose, graphic-painterly, textural-nontextural); Factor IV, Aesthetic-Evaluative (good-bad, strong-weak, interesting-uninteresting, rich-poor, aesthetic-nonaesthetic). Factor V, Decorative (simple-detailed, plain-decorative, simple-complex, stark-lush). The first five factors accounted for approximately 82% of the total variance. No interpretation was made of Factors VI, VII, and VIII due to the limited amount of variance accounted for by these factors.

An inspection of the data reported in Table 13 reveals two important characteristics: (1) the Dynamism (a combination of Osgood's potency and activity factors), Emotive and Structural-Organizational factors are clearly the pervasive dimensions of trained observers' affective behavior; and (2) contrary to what one might expect from previous factorial studies (6,37), the Aesthetic-Evaluative factor did not appear as an important dimension of trained observers' affective behavior.

In interpreting these results the reader should keep in mind that the data reported in Table 13 were based on averaged art differential ratings for the entire group of trained observers. The averaging procedure is commonly used in analyzing semantic differential data when the researcher is interested in group behavior rather than individual behavior. In addition, from a measurement point of view, despite loss of sensitivity, group data removes a major source of variability from the data matrix. However, in terms of the unexpected results reported for the Aesthetic-Evaluative factor, it was reasonable to question whether the averaged factor structures and proportions reported in Table 13 were invariant with respect to individuals comprising the averaged group.

In other words, did individual differences exist within the averaged factor structures which might account for the small proportion of total variance attributed to the Aesthetic-Evaluative factor?

In order to answer this question, the data were reanalyzed without applying the averaging procedure to individual observers' art differential ratings. The results of this analysis are reported in Table 14.

An examination of these data indicates that despite loss in total variance accounted for by this analysis, there was a substantial shift in the proportion of variance accounted for by the factors identified in Table 14 in comparison with the factorial variance reported in Table 13. While the factor structures reported in these tables remained essentially the same, in Table 14 the Aesthetic-Evaluative factor emerged as the dominant dimension of trained observers' affective behavior, while the importance of the Dynamism, Emotive and Structural-Organizational factors decreased substantially.

Two conclusions were suggested by the data reported in Tables 13 and 14: (1) the Aesthetic-Evaluative factor was the most stable overall dimension of trained observers' affective behavior; and, (2) the relative importance of the Dynamism, Emotive and Structural-Organizational factors may be a function of differences among the individual observers. Obviously the former conclusion was more in line with the researchers' intuitive expectations.

TABLE 13

SUMMARY OF FACTOR LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 8 VARIMAX FACTORS BASED ON TRAINED OBSERVERS' MEAN RATINGS OF 24 SLIDES OF PAINTINGS ON A 50 SCALE ART DIFFERENTIAL*

FACTOR I (26.8)

violent-peaceful .97
explosive-serene .95
dynamic-static .93
moving-still .91
vibrating-still .88
noisy-quiet .85
bold-meek .72
painful-painless .67
weird-ordinary .64
powerful-powerless .62
disturbing-pleasing .59
disorganized-organized .55
grotesque-elegant .52
linear-massive .45

FACTOR II (22.3)

sad-happy .92
gloomy-bright .88
solemn-gay .84
depressing-uplifting .82
heavy-light .81
dark-light .74
drab-colorful .57
heavy-delicate .54
disturbing-pleasing .54
painful-painless .52
deep-shallow .50
ugly-beautiful .42
emotional-nonemotional .40

FACTOR III (17.2)

clear-fuzzy .93
stiff-loose .87
graphic-painterly .78
nontextural-textural .77
concrete-mystical .68
organized-disorganized .66
impersonal-personal .59
nonsensitive-sensitive .55
geometric-organic .54
nonemotional-emotional .49
uninvolved-involved .48
stark-lush .43

FACTOR IV (8.5)

good-bad .93
strong-weak .79
interesting-uninteresting .73
rich-poor .66
aesthetic-nonaesthetic .65
powerful-powerless .64
sensitive-nonsensitive .50
heavy-delicate .47
warm-cool .40

FACTOR V (6.7)

simple-detailed .91
plain-decorative .87
simple-complex .79
stark-lush .75
uninvolved-involved .54
geometric-organic .52
nontextural-textural .43

FACTOR VI (4.7)

stylized-nonstylized .80
symbolic-nonsymbolic .75
weird-ordinary .66
idealized-nonidealized .61
grotesque-elegant .55
mystical-concrete .53
disturbing-pleasing .44

TABLE 13 (continued)

FACTOR VII (2.8)	
earthy-heavenly	.82
lowly-majestic	.81
nonidealized-idealized	.50
grotesque-elegant	.48
ugly-beautiful	.42

FACTOR VIII (2.4)	
sensual-nonsensual	.72
massive-linear	.53
organic-geometric	.41

*Only those qualifier scales with a factor loading of greater than .40 have been reported.

TABLE 14

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 5 VARIMAX FACTORS BASED ON 48 TRAINED OBSERVERS' INDIVIDUAL RATINGS OF 24 SLIDES OF PAINTINGS ON A 50 SCALE ART DIFFERENTIAL*

FACTOR I (17.8)

interesting-uninteresting .79
good-bad .79
strong-weak .77
sensitive-nonsensitive .69
aesthetic-nonaesthetic .67
powerful-powerless .66
rich-poor .60
beautiful-ugly .57
sensual-nonsensual .53
involved-uninvolved .49
emotional-nonemotional .49
personal-impersonal .47
deep-shallow .47
organized-disorganized .43
majestic-lowly .41

FACTOR II (11.8)

explosive-serene .86
violent-peaceful .80
noisy-quiet .80
moving-still .79
vibrating-still .74
dynamic-static .70
bold-meek .56
weird-ordinary .50
colorful-drab .42
grotesque-elegant .42

FACTOR III (10.7)

sad-happy .81
gloomy-bright .81
depressing-uplifting .78
solemn-gay .69
disturbing-pleasing .60
dark-light .57
stark-lush .56
painful-painless .51
ugly-beautiful .51
heavy-light .49
drab-colorful .44

FACTOR IV (7.6)

graphic-painterly .71
geometric-organic .68
stiff-loose .65
nontextural-textural .65
simple-detailed .59
clear-fuzzy .58
simple-complex .53
organized-disorganized .45
uninvolved-involved .43
plain-decorative .42
personal-impersonal .41

FACTOR V (4.0)

heavy-delicate .56
earthy-heavenly .53
heavy-light .53
nonsymbolic-symbolic .47
concrete-mystical .43
nonidealized-idealized .41

*Only those qualifier scales with a factor loading of greater than .40 have been reported.

3.12 Results for Untrained Observers

Table 15 summarizes the major scales associated with seven varimax factors based on 48 trained observers' mean art differential ratings of 24 color slides of paintings.

On the basis of the scales with the highest loadings, the dominant factors reported in Table 15 were defined as follows: Factor I, Aesthetic-Evaluative (expressive-unexpressive, meaningful-meaningless, interesting-uninteresting, thoughtful-thoughtless, inspiring-uninspiring, clever-stupid, deep-shallow); Factor II, Potency (tense-relaxing, disturbing-comforting, unpleasant-pleasant, painful-soothing, hard-soft, terrible-wonderful, unfriendly-friendly); Factor III, Structural-Organizational (messy-neat, informal-formal, impure-pure, confusing-clear, rough-smooth); Factor IV, Emotive (bright-dreary, colorful-drab, light-dark, cheerful-depressing, happy-sad). The first four factors accounted for approximately 85% of the total variance. No interpretation was made of Factors V, VI and VII due to the limited amount of variance accounted for by these factors. Data reported in Table 15 clearly identifies the Aesthetic-Evaluative, Potency and Structural-Organizational factors as the salient dimensions of untrained observers' affective behavior with the Emotive factor contributing to a lesser degree. It should be noted that the order and magnitude of the untrained observers' Aesthetic-Evaluative and Potency factors for the 24 paintings compares favorably with the evaluation and potency factors repeatedly found by Osgood and others in crosscultural studies of the affective generality of language (28). The relative stability of the averaged factor structures reported in Table 15 was evaluated by reanalyzing untrained observers' art differential ratings without the averaging procedure. Results from this analysis are shown in Table 16. Given the expected reduction in overall variance accounted for by this analysis, a comparison of the data recorded in Tables 15 and 16 revealed that the relative factorial dominance and structure for the Aesthetic-Evaluative and Potency factors were not influenced by individual differences in the group of untrained observers. However, individual differences appeared to influence the Structural-Organizational and Emotive factors. The Emotive factor, while not dominant in terms of factorial magnitude, appeared to be a good deal more stable as a characteristic of untrained observers' affective behavior than the Structural-Organizational factor which was redistributed across Factors IV, V, and VI in Table 16. These data pointed to the following conclusions: (1) the Aesthetic-Evaluative and Potency factors were the salient dimensions of untrained observers' affective behavior; and (2) with the exception of a slight increase in the percent of variance accounted for by the Emotive factor and the redistribution of components of the Structural-Organizational factor, individual differences among the untrained observers did not substantially influence the structure and magnitude of the averaged factors reported in Table 15.

TABLE 15

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 7 VARIMAX FACTORS BASED ON UNTRAINED OBSERVERS' MEAN RATINGS OF 24 SLIDES OF PAINTINGS ON A 50 SCALE ART DIFFERENTIAL*

FACTOR I (39.9)	
expressive-unexpressive	.97
meaningful-meaningless	.94
interesting-uninteresting	.93
thoughtful-thoughtless	.93
inspiring-uninspiring	.92
clever-stupid	.91
deep-shallow	.90
powerful-powerless	.88
emotional-unemotional	.87
strong-weak	.85
aesthetic-nonaesthetic	.79
symbolic-nonsymbolic	.75
good-bad	.72
great-small	.72
exciting-dull	.72
exciting-blah	.72
rich-poor	.67
tasteful-tasteless	.67
fancy-plain	.55
complex-simple	.52
beautiful-ugly	.45
different-same	.42

FACTOR II (25.8)	
tense-relaxing	.91
disturbing-comforting	.90
unpleasant-pleasant	.90
painful-soothing	.89
hard-soft	.83
terrible-wonderful	.81
unfriendly-friendly	.80
ugly-beautiful	.73
heavy-delicate	.70
stormy-calm	.64
cold-warm	.62
chaotic-peaceful	.56
unnatural-natural	.55
bad-good	.54
strange-familiar	.52
noisy-quiet	.50
common-uncommon	.50
nonaesthetic-aesthetic	.42

FACTOR III (14.7)	
messy-neat	.93
informal-formal	.85
impure-pure	.84
confusing-clear	.84
rough-smooth	.79
same-different	.69

FACTOR IV (5.7)	
bright-dreary	.97
colorful-drab	.95
light-dark	.79
cheerful-depressing	.77
happy-sad	.72
chaotic-peaceful	.70

TABLE 15 (continued)

FACTOR III (14.7)

uncommon-common .68
complex-simple .65
unreal-real .68
stormy-calm .60
noisy-quiet .59
unnatural-natural .59
moving-still .49

FACTOR IV (5.7)

strange-familiar .68
exciting-dull .47
exciting-blah .46
noisy-quiet .46
wonderful-terrible .41
moving-still .40

FACTOR V (4.4)

heavenly-earthy .91
unreal-real .57

FACTOR VI (2.7)

still-moving .54
heavy-delicate .40

FACTOR VII (2.1)

poor-rich .52
plain-fancy .50
informal-formal .40

*Only those qualifier scales with a factor loading of greater than .40 have been reported.

TABLE 16

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 6 VARIMAX FACTORS BASED ON 48 UNTRAINED OBSERVERS' INDIVIDUAL RATINGS OF 24 SLIDES OF PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (24.5)

interesting-uninteresting .82
meaningful-meaningless .82
expressive-unexpressive .82
inspiring-uninspiring .79
deep-shallow .77
clever-stupid .77
powerful-powerless .76
exciting-dull .75
strong-weak .73
thoughtful-thoughtless .71
a sthetic-nonaesthetic .71
exciting-blah .71
tasteful-tasteless .69
good-bad .69
emotional-unemotional .69
rich-poor .62
great-small .60
beautiful-ugly .60
symbolic-nonsymbolic .57
wonderful-terrible .43

FACTOR II (19.8)

tense-relaxing .79
disturbing-comforting .76
painful-soothing .76
hard-soft .67
unpleasant-pleasant .64
unfriendly-friendly .59
stormy-calm .54
chaotic-peaceful .52
terrible-wonderful .51
sad-happy .50
depressing-cheerful .50
cold-warm .45
heavy-delicate .44
noisy-quiet .41

FACTOR III (8.4)

bright-dreary .85
colorful-drab .80
cheerful-depressing .72
light-dark .69
happy-sad .69
warm-cold .55
friendly-unfriendly .44
wonderful-terrible .40

FACTOR IV (4.2)

strange-familiar .79
unnatural-natural .75
uncommon-common .72
unreal-real .72
different-same .64
confusing-clear .62

FACTOR V (3.5)

quiet-noisy .65
plain-fancy .63
still-moving .62
peaceful-chaotic .61
simple-complex .61
neat-messy .54
calm-stormy .53

FACTOR VI (2.6)

informal-formal .70
earthy-heavenly .50
impure-pure .49
messy-neat .47
rough-smooth .46

*Only those qualifier scales with a factor loading of greater than .40 have been reported.

3.2 Conclusions

The results of this study pointed to the following conclusions: (1) Psychologically meaningful evaluations of the affective characteristics of paintings should include an assessment of their art differential profiles on the major affective factors and defining components identified by this study. An art differential profile for trained observers would describe the combination of the Aesthetic-Evaluative, Dynamism, Emotive and Structural-Organizational factors and components regularly associated with a painting or a group of paintings by trained observers; an art differential profile for untrained observers would describe the combination of the Aesthetic-Evaluative, Potency and Emotive factors and components regularly associated with a painting or a group of paintings by untrained observers. As previously noted, while the structure of these factors remained stable for both groups of observers, the relative importance of these factors was influenced by individual differences within each observer group. An additional source which appeared to influence the dominance but not the overall structure of these factors for both trained and untrained observers was the Representational, Semi-Abstract and Non-Objective style differences among the paintings used as stimuli in Phase II of this study. Tables summarizing the varimax factor structures for the paintings assigned to these style categories can be found in the Appendix. Since analysis of these data goes beyond the research objectives of the present study, in addition to presenting certain questions of statistical confidence, a separate report including art differential profiles for each of the 24 paintings used in Phase II will be published later this year.

(2) While there were apparent overall similarities in the affective behavior of trained and untrained observers at the factorial level, there were marked differences in the affective components (adjective qualifiers) which defined these factors. Trained observers' affective components were characterized by idiosyncratic descriptions of the 'feeling tone' of paintings, while untrained observers' affective components were more general and not unlike the components found by Osgood and others in studying the affective meaning of verbal concepts. These differences can reasonably be attributed to trained observers' formal and informal learning experiences with art objects.

Assuming that the results of this study will stand the test of replication, and there are no apparent methodological reasons to question their reliability, the trained observers' affective reaction system has obvious implications for educational practice which focuses on shaping affective behavior through art instruction. For example, painting exemplars which regularly elicit certain affective components as defined by trained observers' art differential profiles could be used as stimuli in critically oriented learning episodes which require untrained observers to describe, analyze, and evaluate various affective configurations suggested by the painting exemplars.

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APPENDIX

DEPARTMENT OF ART UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

September 13, 1969

Dr. Thomas Hoving, Director
Metropolitan Museum of Art
Fifth Avenue at 82nd Street
New York, New York 10028

Dear Dr. Hoving:

You are one of several scholars representing the various areas of study in art who are being contacted to participate in a large psychologically oriented research project which I am doing for the United States Office of Education in the area of affective meaning in painting.

In order to accurately and fully describe the project, I have enclosed an abstract of the original research proposal for you to read and retain.

Specifically, you are being asked to provide an important evaluation which will directly shape the collection and analysis of the data for this research project. This evaluation consists of responding, from your point of view, to two questions about the paintings tentatively selected for use as stimuli by this study. Both the questions and a list of the paintings are enclosed.

After you have answered the questions to your satisfaction, please return the questions, the list of paintings, and any additional comments that you may have in the enclosed self-addressed envelope. Your name will be placed on the mailing list to receive a copy of the final report of this research project.

Your assistance in this project will be greatly appreciated.

Very truly yours,

George W. Hardiman
Associate Professor of Art

GWH:vh
Enclosures: 1. Abstract of proposal
2. List of paintings
3. Questions
4. Self-addressed stamped envelope for return

QUESTIONS SENT TO ART HISTORIANS

QUESTION 1:

Given the operational limitation of approximately 200 paintings, in your opinion do the paintings selected for use in Part I of this study adequately represent the major style periods in the history of Western painting from the Gothic through the Twentieth Century? (Please indicate any important additions, substitutions, deletions, or style reclassifications on the attached list of paintings.)

RESPONSE:

QUESTION 2:

Which paintings or groups of paintings from the attached list would you be most interested in having evaluated in Part II of this study? (Please indicate below the numbers in the left margin of the list to identify your choices. Please limit your selection to no more than 50 paintings. A brief indication of your criteria for selecting the paintings would be most helpful.)

RESPONSE:

#____

PERSONAL HISTORY STATEMENT*

NAME:________________________ AGE:_____ SEX:_____

COLLEGE MAJOR:________________________

YEAR: ( ) Freshman ( ) Sophomore ( ) Junior ( ) Senior ( ) Graduate

ART EXPERIENCE:

( ) JUNIOR HIGH SCHOOL ( ) Number of Years

( ) SENIOR HIGH SCHOOL ( ) Number of Years

( ) COLLEGE (Estimate the number of semester hours or quarter hours in each of the following areas of study)

	Semester Hours	Quarter Hours
Art Studio	_____	_____
Art History, Aesthetics, Art Appreciation	_____	_____
Art Education Methods	_____	_____

( ) OTHER ART INSTRUCTION (Specify)________________________

RESPONSE FORM*

SLIDE NUMBER____________

____

*Originally reproduced on half sheets of paper

(READ IN ADVANCE)

INSTRUCTIONS FOR ORGANIZING AND ADMINISTERING PHASE I OF THE HARDIMAN ART DIFFERENTIAL STUDY

FACILITIES AND EQUIPMENT NECESSARY FOR ADMINISTERING THE EXPERIMENT

A. 35mm carrousel slide projector
B. Standard size viewing screen (approximately 60"x60")
C. Semi-darkened room appropriate for viewing colored slides
D. Blackboard, chalk, and a few extra pencils

STEPS TO BE TAKEN BY THE ADMINISTRATOR BEFORE THE EXPERIMENT BEGINS

A. Set up the 35mm carrousel slide projector and the slide carrousel in a semi-darkened room appropriate for viewing color slides before the students enter the classroom.

B. Run through the slides to check on size, placement and focus. Each slide should fill a standard size screen. For the purpose of this experiment, the slides have been randomized and prearranged in the carrousel tray which you have received. Please do not alter the order of presentation in any way.

PROCEDURES TO BE FOLLOWED BY THE ADMINISTRATOR DURING THE EXPERIMENT

During the experiment each slide should be exposed on the screen for a period of 30 seconds, during which time the students should make no response. Establish the 30 second time interval by using a watch or clock with a second hand. When the 30 second time interval is up, cover the lens of the slide projector by hand with the piece of matboard you will find in the box containing the slide carrousel. An interval of ten seconds should be adequate for each response, but this time should initially be adjusted to the slowest observer. At the end of the 10 second response interval, while the lens is still covered, change to the next slide. Just before the next slide is to appear on the screen, announce very clearly, "Please turn to the next response sheet for Slide Number__." Once this instruction has been given, remove the matboard cover from the lens of the projector and show the next slide for a full 30 seconds. Follow this procedure for each slide.

INSTRUCTIONS FOR STUDENTS PARTICIPATING IN PHASE I OF THE HARDIMAN ART DIFFERENTIAL STUDY

After the subjects are seated do the following:

A. See that all unnecessary materials are removed from the subjects' desks.
B. See that all subjects have a pen or a pencil.
C. Pass out a response booklet to each subject.
D. Have subjects fill in the Personal History Statement (cover sheet attached to the front of their response booklet) and number their response forms from __ to __. (The number should be placed after the term Slide Number which appears near the middle of each response form. Hold up a sample response form to indicate where the number should be placed.)

When the above has been completed read the following to the subjects: (Place special emphasis on underlined areas.)

"I am going to show you __ color slides of historically significant paintings for the purpose of determining what these paintings mean to you. The slides that you will see are arranged in a random order and include works from the Gothic period through the Twentieth Century. Each slide will be exposed on the screen in front of you for a period of 30 seconds. During this time, please study each slide carefully. After the 30 seconds are up the slide will be removed from the screen and you will respond to it by writing in the space provided on the response form the ONE adjective qualifier which in your opinion best describes your immediate feeling about the painting (hold up sample response form to indicate the exact space). You are expected to respond to all of the slides. In thinking of an adjective it may be helpful to keep in mind these sets": (Test administrator writes the following two sets on the blackboard and indicates where the adjective qualifier should be placed.)

The (adjective qualifier) painting.
This painting is (adjective qualifier).

(Continue reading:)

"Remember, it is most important that you select the ONE adjective qualifier which best describes your immediate feeling about each painting. As soon as you have selected an adjective, write it clearly on the appropriate response sheet. Please do not change your response. The experiment is concerned with your immediate impressions or feelings. You will have approximately 10 seconds to write your response. Treat each painting individually when responding to it. Try not to be influenced

INSTRUCTIONS FOR STUDENTS (continued)

by responses that you have made to previous paintings. After you have written your response, turn to the next response sheet in preparation for the next slide. I will indicate the number of each slide to you just before it appears on the screen so that you can check to be sure that you have the correct response sheet. The experiment will take about 40-45 minutes. I think you will enjoy it very much. Are there any questions?" (NOTE: At this time, only answer questions which relate to procedures described above and not to the value or substance of the experiment itself.)

Please collect all response booklets immediately following the experiment.

ART DIFFERENTIAL INSTRUMENT FOR TRAINED OBSERVERS

POWERFUL _____:_____:_____:_____:_____:_____:_____: POWERLESS

STILL _____:_____:_____:_____:_____:_____:_____: VIBRATING

GROTESQUE _____:_____:_____:_____:_____:_____:_____: ELEGANT

NON-AESTHETIC _____:_____:_____:_____:_____:_____:_____: AESTHETIC

FUZZY _____:_____:_____:_____:_____:_____:_____: CLEAR

CONCRETE _____:_____:_____:_____:_____:_____:_____: MYSTICAL

EMOTIONAL _____:_____:_____:_____:_____:_____:_____: NON-EMOTIONAL

HEAVY _____:_____:_____:_____:_____:_____:_____: DELICATE

PERSONAL _____:_____:_____:_____:_____:_____:_____: IMPERSONAL

ORGANIC _____:_____:_____:_____:_____:_____:_____: GEOMETRIC

DETAILED _____:_____:_____:_____:_____:_____:_____: SIMPLE

GAY _____:_____:_____:_____:_____:_____:_____: SOLEMN

QUIET _____:_____:_____:_____:_____:_____:_____: NOISY

PAINLESS _____:_____:_____:_____:_____:_____:_____: PAINFUL

BOLD _____:_____:_____:_____:_____:_____:_____: MEEK

HEAVENLY _____:_____:_____:_____:_____:_____:_____: EARTHY

ART DIFFERENTIAL INSTRUMENT (continued)

STYLIZED ____:____:____:____:____:____:____: NON-STYLIZED

EXPLOSIVE ____:____:____:____:____:____:____: SERENE

MOVING ____:____:____:____:____:____:____: STILL

NON-SENSITIVE ____:____:____:____:____:____:____: SENSITIVE

DYNAMIC ____:____:____:____:____:____:____: STATIC

LIGHT ____:____:____:____:____:____:____: HEAVY

MAJESTIC ____:____:____:____:____:____:____: LOWLY

NON-TEXTURAL ____:____:____:____:____:____:____: TEXTURAL

DISTURBING ____:____:____:____:____:____:____: PLEASING

STIFF ____:____:____:____:____:____:____: LOOSE

PLAIN ____:____:____:____:____:____:____: DECORATIVE

INTERESTING ____:____:____:____:____:____:____: UNINTERESTING

MASSIVE ____:____:____:____:____:____:____: LINEAR

IDEALIZED ____:____:____:____:____:____:____: NON-IDEALIZED

DEPRESSING ____:____:____:____:____:____:____: UPLIFTING

SIMPLE ____:____:____:____:____:____:____: COMPLEX

ART DIFFERENTIAL INSTRUMENT (continued)

DARK ____:____:____:____:____:____:____: LIGHT

SENSUAL ____:____:____:____:____:____:____: NON-SENSUAL

UGLY ____:____:____:____:____:____:____: BEAUTIFUL

WARM ____:____:____:____:____:____:____: COOL

UNINVOLVED ____:____:____:____:____:____:____: INVOLVED

STARK ____:____:____:____:____:____:____: LUSH

DISORGANIZED ____:____:____:____:____:____:____: ORGANIZED

GRAPHIC ____:____:____:____:____:____:____: PAINTERLY

RICH ____:____:____:____:____:____:____: POOR

DEEP ____:____:____:____:____:____:____: SHALLOW

WEAK ____:____:____:____:____:____:____: STRONG

GOOD ____:____:____:____:____:____:____: BAD

VIOLENT ____:____:____:____:____:____:____: PEACEFUL

WEIRD ____:____:____:____:____:____:____: ORDINARY

NON-SYMBOLIC ____:____:____:____:____:____:____: SYMBOLIC

COLORFUL ____:____:____:____:____:____:____: DRAB

SAD ____:____:____:____:____:____:____: HAPPY

GLOOMY ____:____:____:____:____:____:____: BRIGHT

ART DIFFERENTIAL INSTRUMENT FOR UNTRAINED OBSERVERS

HARD _____:_____:_____:_____:_____:_____:_____: SOFT

SMOOTH _____:_____:_____:_____:_____:_____:_____: ROUGH

THOUGHTLESS _____:_____:_____:_____:_____:_____:_____: THOUGHTFUL

NON-AESTHETIC _____:_____:_____:_____:_____:_____:_____: AESTHETIC

IMPURE _____:_____:_____:_____:_____:_____:_____: PURE

PLEASANT _____:_____:_____:_____:_____:_____:_____: UNPLEASANT

EXCITING _____:_____:_____:_____:_____:_____:_____: BLAH

RELAXING _____:_____:_____:_____:_____:_____:_____: TENSE

INFORMAL _____:_____:_____:_____:_____:_____:_____: FORMAL

TASTEFUL _____:_____:_____:_____:_____:_____:_____: TASTELESS

CHEERFUL _____:_____:_____:_____:_____:_____:_____: DEPRESSING

WARM _____:_____:_____:_____:_____:_____:_____: COLD

STUPID _____:_____:_____:_____:_____:_____:_____: CLEVER

COLORFUL _____:_____:_____:_____:_____:_____:_____: DRAB

DISTURBING _____:_____:_____:_____:_____:_____:_____: COMFORTING

DREARY _____:_____:_____:_____:_____:_____:_____: BRIGHT

MEANINGLESS _____:_____:_____:_____:_____:_____:_____: MEANINGFUL

ART DIFFERENTIAL INSTRUMENT (continued)

SYMBOLIC _____:_____:_____:_____:_____:_____:_____: NON-SYMBOLIC

CALM _____:_____:_____:_____:_____:_____:_____: STORMY

COMMON _____:_____:_____:_____:_____:_____:_____: UNCOMMON

HEAVENLY _____:_____:_____:_____:_____:_____:_____: EARTHY

POWERFUL _____:_____:_____:_____:_____:_____:_____: POWERLESS

DULL _____:_____:_____:_____:_____:_____:_____: EXCITING

INTERESTING _____:_____:_____:_____:_____:_____:_____: UNINTERESTING

HAPPY _____:_____:_____:_____:_____:_____:_____: SAD

DELICATE _____:_____:_____:_____:_____:_____:_____: HEAVY

WONDERFUL _____:_____:_____:_____:_____:_____:_____: TERRIBLE

DEEP _____:_____:_____:_____:_____:_____:_____: SHALLOW

STILL _____:_____:_____:_____:_____:_____:_____: MOVING

STRANGE _____:_____:_____:_____:_____:_____:_____: FAMILIAR

BAD _____:_____:_____:_____:_____:_____:_____: GOOD

PAINFUL _____:_____:_____:_____:_____:_____:_____: SOOTHING

REAL _____:_____:_____:_____:_____:_____:_____: UNREAL

EMOTIONAL _____:_____:_____:_____:_____:_____:_____: UNEMOTIONAL

ART DIFFERENTIAL INSTRUMENT (continued)

FANCY ____:____:____:____:____:____:____: PLAIN

STRONG ____:____:____:____:____:____:____: WEAK

NEAT ____:____:____:____:____:____:____: MESSY

DARK ____:____:____:____:____:____:____: LIGHT

CHAOTIC ____:____:____:____:____:____:____: PEACEFUL

INSPIRING ____:____:____:____:____:____:____: UNINSPIRING

QUIET ____:____:____:____:____:____:____: NOISY

EXPRESSIVE ____:____:____:____:____:____:____: UNEXPRESSIVE

SAME ____:____:____:____:____:____:____: DIFFERENT

POOR ____:____:____:____:____:____:____: RICH

SMALL ____:____:____:____:____:____:____: GREAT

SIMPLE ____:____:____:____:____:____:____: COMPLEX

UNFRIENDLY ____:____:____:____:____:____:____: FRIENDLY

CONFUSING ____:____:____:____:____:____:____: CLEAR

UNNATURAL ____:____:____:____:____:____:____: NATURAL

UGLY ____:____:____:____:____:____:____: BEAUTIFUL

INSTRUCTIONS FOR SUBJECTS PARTICIPATING IN PHASE II OF THE HARDIMAN ART DIFFERENTIAL STUDY

After the subjects are seated do the following:

A. See that all unnecessary materials are removed from the subjects' desks.
B. See that all subjects have a pen or a pencil.
C. Pass out a response booklet to each subject.
D. Have subjects fill in the Personal History Statement (the cover sheet attached to the front of their response packet) and number their response sheets from one to twelve. (NOTE: EACH PAINTING REQUIRES TWO RESPONSE SHEETS (A AND B) WITH 25 DIFFERENT ADJECTIVE SCALES ON EACH SHEET: RESPONSE SHEETS SHOULD BE CAREFULLY NUMBERED 1A, 1B, 2A, 2B, 3A, 3B, and so on)

When the above has been completed read the following to the subjects: (Place special emphasis on underlined areas.)

"The purpose of this experiment is to discover what a group of paintings mean to you by getting you to record your immediate impressions and feelings about each painting on a set of bipolar adjective scales commonly used to describe works of art. The paintings that you will see have been arranged in random order and include historically significant works from the Gothic Period through the Twentieth Century.

In your response packet you will find a set of 24 response sheets, two different sheets (A and B, 50 adjective scales in all) for each painting. You will rate each painting on the basis of what it means to you by placing a check mark on each of the scales wherever you feel it should be placed. Here are some examples of the way you should do this task. (Have example on the board)

good_____:_____:_____:_____:_____:_____:_____:bad

You might say that the seven spaces have roughly these meanings from left to right: extremely good; good; slightly good; neither good nor bad, or both equally; slightly bad, bad, extremely bad. In any case, place a check mark on each of the scales where you feel the painting should be rated according to your first impression or feeling. Do not hesitate to use the extreme ends of the scales whenever they seem appropriate. Treat each painting individually when responding to it. Be sure to put only one check mark on each scale. Do not change your ratings.

You will see 24 paintings in all, 12 at each hourly session. Slides of each painting will be exposed on the screen in front of you for a period of four minutes. Please study each painting carefully for the first minute or so, then rate each painting on the appropriate response sheets (A and B). Try not to be influenced by responses that you have made to previous paintings. I will indicate the number of each painting to you just before it appears on the screen so that you can check to be sure that you have the correct response sheet in front of you.

If in some cases you may wonder how a certain scale might apply to a particular painting, remember that we want you to respond with your first impressions or feelings about the painting only. Work as quickly as possible and you will be able to make your decisions quite easily. This session of the experiment will take about 45 or 50 minutes. I think you will enjoy it very much. Are there any questions?" (NOTE: At this time, only answer questions which relate to procedures described above and not to the value or substance of the experiment itself.)

Please collect all response packets immediately following the experiment.

DESCRIPTION OF PHASE I ANALYSIS

H-VALUE AND PHI COEFFICIENT

Input for H

Associates (responses) in alphabetic order

	1	...	j	...	n
1	f_{11}	...	f_{1j}	...	f_{1n}
Stimuli					
i	f_{i1}	...	f_{ij}	...	f_{in}
m	f_{m1}	...	f_{mj}	...	f_{mn}
Totals for each j	$\sum_i f_{i1} = N_1$	...	f_{ij} i $= N_j$	...	$\sum_i f_{in} = N_n$
log's for each j	$\sum_i (f_{i1} \log f_{i1})$ $N_1 \log N_1$	...	$\sum_i (f_{ij} \log f_{ij})$ $N_j \log N_j$	...	$\sum_i (f_{ij} \log f_{in})$ $N_n \log N_n$

-- $\sum_j \sum_i f_{ij} = N_T$

-- $\sum_j N_i = N_T$

H index (j) = $N_j \log N_j - \sum_i (f_{ij} \log f_{ij}) \cdot \frac{1}{N_T}$

derived from $H_{J\,(I)} = - \sum_{ji} P_{ji} \log P_j\,(i)$ where $P_{ji} = \frac{fij}{N_T}$; $P_j\,(i) = \frac{fij}{N_j}$

NOTE: $\sum_j$ H index (j) = $H_{J\,(I)}$

DESCRIPTION OF PHASE I ANALYSIS (continued)

Input for Ø Dichotomous Coding (d) for Occurrence of Associates

Associates (responses) in H-rank order

		1	...	j	...	k	...	p	...	n
	1	d_{11}	...	d_{1j}	...	d_{ik}	...		...	d_{in}
	⋮	⋮		⋮		⋮				⋮
Stimuli	i	d_{i1}	...	d_{ij}	...	d_{ik}	...		...	d_{kn}
	⋮	⋮		⋮		⋮				⋮
	m	d_{m1}	...	d_{mj}	...	d_{mk}	...		...	d_{mn}
Totals for each j		$\sum_i d_{i1}$		$\sum_i d_{ij}$		$\sum_i d_{ik}$		$\sum_i d_{ip}$		$\sum_i d_{in}$

$$d_{ij} = \begin{cases} 0 & \text{if } f_{ij} = 0 \\ 1 & \text{if } f_{ij} \quad 0 \end{cases}$$

Associates p through n have H = 0 (occur to one stimulus only) i.e., $\sum_i$ dij = 1

$\sum_i d_{ij}$ = Diversity of response

$$\emptyset_{jk} = \frac{ab - cd}{\sqrt{(a+c)(d+b)(a+d)(c+b)}}$$

		k		
		1	0	
j	1	a	c	$\sum_i$ dij
	0	d	b	m - ($\sum_i$ dij)
		$\sum_i$ dik	m = ($\sum_i$ dik)	

a = $\sum_i$ (dij dik) = frequence of joint occurrence of j and k.

c = ($\sum_i$ dij) - a = frequency of unique occurrence of j.

d = ($\sum_i$ dik) - a = frequency of unique occurrence of k.

b = m-a-c-d = frequency of no occurrence of j and k.

DESCRIPTION OF PHASE I ANALYSIS (continued)

Selection Procedure

Table of PHI Co-efficients

Associates (responses) in H-Rank order

	1	...	j	...	k	...	p-1
1	$Ø_{11}$	...	$Ø_{1j}$	...	$Ø_{1k}$	...	$Ø_{1\ (p-1)}$
	⋮		⋮		⋮		⋮
j	$Ø_{j1}$	...	$Ø_{jj}$	...	$Ø_{jk}$	...	$Ø_{j\ (p-1)}$
	⋮		⋮		⋮		⋮
k	$Ø_{k1}$	...	$Ø_{kj}$	...	$Ø_{kk}$	...	$Ø_{k\ (p-1)}$
	⋮		⋮		⋮		⋮
p-1	$Ø_{(p-1)1}$	...	$Ø_{(p-1)j}$	...	$Ø_{(p-1)k}$	...	$Ø_{(p-1)(p-1)}$

Cutoff Ø set to some arbitrary P, say P.05 for N=m, one tail.

Procedure:

1. For Row 1, cross out all rows and columns with $Ø_{1j} \geq$ CUTOFF, except $Ø_{11}$
2. Go to next row in order remaining after cross outs, say Row i
3. For next row, i, cross out all rows and columns with $Ø_{i,j} \geq$ CUTOFF, except $Ø_{i,i}$
4. Continue steps 2 and 3 until no more rows remain to be tested.

The remaining, reduced matrix, are the associates selected as being independent and for the most part from the higher H valued range.

PRINCIPAL AXIS FACTOR ANALYSIS
(Eigenvalues and Vectors)

I. General Description

The purpose of PRINCIPAL AXIS FACTOR ANALYSIS is to determine a factor matrix, F, given a Gramian matrix, R, of order n such that

$$F_{(n,f)}F'_{(f,n)}=R^{*}_{(n,n)}$$

where R* is an approximation to R.

The column vectors of F are defined as the factors (measures of dimensionality) of the original matrix, R. The solution for the matrix F is the classical eigen problem. Consequently, the computations are done by an eigenvalue subroutine. Before output the eigenvectors, Ej, are scaled as follows:

F(I,J) = E(I,J)*LAMBDA(J)**.5

for I = 1,....,n. J = 1,....,n.
to generate the principal axis factors, F.

For a more detailed discussion see:

Harry Harmon, Modern Factor Analysis, Chicago, University of Chicago Press, 1960, pp. 154-191.

II. Restrictions

The input matrix for the PRINCIPAL AXIS program must not exceed the dimensions of 190 x 190 double precision. The input matrix is further limited to being a square, symmetric matrix. Generally correlation, covariance, or cross-product matrices are used as input data. It should be noted that matrices with large numerical entries such as cross-products may generate output values which cannot be printed under the fixed output formats. The probability of this happening is very small. Any communality estimation (i.e., change in the diagonal entries of R) must be done prior to the input of R, to the PRINCIPAL AXIS program.

If the communality estimates are used, the user should check the resulting roots for negative numbers. If any exist the associated vector is meaningless.

PRINCIPAL AXIS FACTOR ANALYSIS (continued)

The input data may come from any source conforming to SOUPAC. Similarly, the output codes follow the established conventions and are specified at the option of the user.

The R matrix may be completely factored (i.e., N factors from N variable matrix). However, there are three criteria which may be used to stop the factoring:

1. The user may specify the number of factors to be extracted. This criterion provides an upper limit beyond which factoring will not proceed. Therefore it is necessary to put the maximum value in this limit in cases where it is not the primary criterion.

2. The percentage of total variance removed from R is the second limiting criterion. This parameter also specifies an upper limit to the process. Therefore, it should be set at 100 per cent unless it is the criterion for stopping.

3. The last criterion is to stop when the factor contribution (eigenvalue or root) falls below 1. The use of this procedure is dictated by the presence of its parameter.

If all three criteria are employed simultaneously, factoring is stopped by whichever criterion is first met.

III. Parameters

The parameters for the PRINCIPAL AXIS program appear on the program call card. They must follow the program name in this order:

Parameter Number	Use or Meaning
1	Input Address. CARDS or SEQUENTIAL 1-15.
2	Output Address. SEQUENTIAL 1-15 and/or PRINT.
3	Maximum number of factors to be extracted. This must be less than or equal to the order of the input matrix.
4	The percentage of total variance to be removed expressed as an integer between 0 and 100.

PRINCIPAL AXIS FACTOR ANALYSIS (continued)

Parameter Number	Use or Meaning
5	The presence of a number greater than 0 indicates the factoring should stop when the eigenvalues (roots) fall below unity)
6	Output Address of Eigenvectors
7	The address of where eigenvalues are to be placed as a row vector if they must be stored for further use. If values need not be saved, leave parameter blank. PRINT is not valid.
8	Mode of sorting eigenvalues and associated vectors. The codes are as follows:

Code	Meaning
0	Descending algebraic order
1	Descending absolute values
2	Order of extraction
10	Ascending algebraic order (the k smallest root)
11	Ascending absolute values
12	Reverse order of extraction

Leaving any parameter blank is the same as specifying zero. Consequently, options which are not needed can be avoided by leaving the associated parameter blank.

IV. Special Comments

No reliable timing estimates exist as yet.

October 13, 1969

VARIMAX FACTOR ROTATION

I. General Description

VARIMAX ROTATION is used to redistribute a factor matrix (principal axis, centroid, etc.) variance so that the matrix approaches orthogonal simple structure. The varimax scheme maximizes the following criterion function:

$$ {}_{s}(h \; {}_{j}(a_{(j,s)}{}^{2/h}{}_{(j)}{}^{2})^{2} - (\; {}_{j}(a_{(j,s)}{}^{2/h}{}_{(j)}{}^{2}))^{2}) $$

where j is the variable index number: 1,........, n

s is the factor index number: 1,........., f

$a_{(j,s)}$ is the factor loading of the j^{th} variable on the

s^{th} factor h_j^2 is the j^{th} variable communality

For further discussion see:

H.F. Kaiser, "Computer Program for Varimax Rotation in Factor Analysis", Educational and Psychological Measurement, Vol. XIX, Nov. 3, 1959, pp. 413-420.

Cooley and Lohnes, Multivariate Procedures for the Behavioral Sciences, New York, John Wiley and Sons, Inc., 1962, pp. 161-3.

II. Restrictions

The input matrix for VARIMAX ROTATION must not exceed 190 variables and 190 factors. The number of factors may be anything greater than or equal to 2. Any factor matrix generated by a statistical system factor analysis program is acceptable input. A matrix may also be entered from cards.

III. Parameters

The parameters for the VARIMAX ROTATION appear on the program call card. They must follow the program name in this order:

Parameter Number	Use or Meaning
1	Input Address. CARDS or SEQUENTIAL 1-15.

VARIMAX FACTOR ROTATION (continued)

Parameter Number	Use or Meaning
2	Output Address. SEQUENTIAL 1-15 and/or PRINT.
3	The presence of a number greater than 0 in this parameter indicated the communalities should be printed.
4	0 or blank for normal VARIMAX. 1 if raw VARIMAX is desired.

SOUPAC (Statistically Oriented Users Programming and Consulting)

TABLE 17

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 5 VARIMAX FACTORS BASED ON 48 TRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF REPRESENTATIVE PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (16.8)

interesting-uninteresting .81
strong-weak .81
good-bad .78
powerful-powerless .72
sensitive-nonsensitive .63
aesthetic-nonaesthetic .58
rich-poor .54
beautiful-ugly .50
organized-disorganized .50
sensual-nonsensual .47
involved-uninvolved .47
emotional-nonemotional .42
deep-shallow .41

FACTOR II (12.0)

violent-peaceful .84
explosive-serene .79
moving-still .76
noisy-quiet .74
vibrating-still .66
painful-painless .63
disturbing-pleasing .59
grotesque-elegant .54
dynamic-static .54
weird-ordinary .44
bold-meek .40
massive-linear .40

FACTOR III (8.8)

stark-lush .68
geometric-organic .66
graphic-painterly .64
simple-detailed .59
stiff-loose .52
plain-decorative .52
simple-complex .52
impersonal-personal .42

FACTOR IV (6.4)

sad-happy .82
gloomy-bright .83
solemn-gay .77
drab-colorful .60
depressing-uplifting .57
heavy-light .56
dark-light .56

FACTOR V (5.6)

heavenly-earthy .71
idealized-nonidealized .59
symbolic-nonsymbolic .53
mystical-concrete .52
majestic-lowly .52
delicate-heavy .42

TABLE 18

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 5 VARIMAX FACTORS BASED ON 48 TRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF SEMI-ABSTRACT PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (17.5)

depressing-uplifting .84
sad-happy .82
gloomy-bright .79
disturbing-pleasing .74
painful-painless .73
solemn-gay .72
dark-light .64
ugly-beautiful .62
grotesque-elegant .62
stark-lush .58
heavy-delicate .57
violent-peaceful .55
weird-ordinary .40

FACTOR II (15.4)

strong-weak .77
good-bad .75
interesting-uninteresting .75
powerful-powerless .71
sensitive-nonsensitive .70
aesthetic-nonaesthetic .63
emotional-nonemotional .59
personal-impersonal .56
sensual-nonsensual .55
involved-uninvolved .54
rich-poor .52
organized-disorganized .49
bold-meek .48
beautiful-ugly .45
symbolic-nonsymbolic .45
deep-shallow .43
colorful-drab .42

FACTOR III (8.4)

noisy-still .79
explosive-serene .73
vibrating-still .71
moving-still .71
dynamic-static .66
complex-simple .62
detailed-simple .49

FACTOR IV (5.4)

stiff-loose .68
graphic-painterly .57
geometric-organic .55
clean-fuzzy .54
nontextural-textural .52
stylized-nonstylized .42

FACTOR V (4.0)

concrete-mystical .64
earthy-heavenly .49
heavy-delicate .49
warm-cool .49
heavy-light .47
nonsymbolic-symbolic .43

TABLE 19

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 5 VARIMAX FACTORS BASED ON 48 TRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF NON-OBJECTIVE PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (22.8)

ugly-beautiful .83
bad-good .80
uninteresting-interesting .78
weak-strong .73
nonaesthetic-aesthetic .70
poor-rich .66
disturbing-pleasing .63
powerless-powerful .63
nonsensitive-sensitive .62
depressing-uplifting .62
grotesque-elegant .60
nonsensual-sensual .51
lowly-majestic .50
meek-bold .45

FACTOR II (12.6)

organic-geometric .82
painterly-graphic .81
loose-stiff .80
textural-nontextural .76
fuzzy-clear .71
disorganized-organized .64
detailed-simple .62
complex-simple .59
mystical-concrete .56
emotional-nonemotional .51
involved-uninvolved .51
lush-stark .51
personal-impersonal .48
sensual-nonsensual .40

FACTOR III (10.1)

noisy-quiet .83
explosive-serene .83
violent-peaceful .71
moving-still .71
vibrating-still .69
dynamic-static .66
gay-solemn .65
colorful-drab .57
warm-cool .54
bold-meek .48
bright-gloomy .47
decorative-plain .45
happy-sad .41

FACTOR IV (6.8)

heavy-delicate .75
heavy-light .75
dark-light .62
sad-happy .50
massive-linear .48
solemn-gay .47
gloomy-bright .44
bold-meek .40

FACTOR V (3.4)

symbolic-nonsymbolic .63
idealized-nonidealized .48
weird-ordinary .43
painful-painless .40

TABLE 20

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 7 VARIMAX FACTORS BASED ON 48 UNTRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF REPRESENTATIONAL PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (23.4)

expressive-unexpressive	.79
interesting-uninteresting	.78
meaningful-meaningless	.77
inspiring-uninspiring	.77
clever-stupid	.74
exciting-dull	.73
strong-weak	.73
powerful-powerless	.72
deep-shallow	.72
thoughtful-thoughtless	.69
exciting-blah	.66
emotional-unemotional	.65
aesthetic-nonaesthetic	.64
beautiful-ugly	.63
good-bad	.63
tasteful-tasteless	.63
great-small	.57
rich-poor	.55
symbolic-nonsymbolic	.51
wonderful-terrible	.48

FACTOR II (17.6)

peaceful-chaotic	.82
noisy-quiet	.80
calm-stormy	.78
relaxing-tense	.74
soothing-painful	.72
disturbing-comforting	.70
still-moving	.57
pleasant-unpleasant	.48
wonderful-terrible	.46
friendly-unfriendly	.42
cheerful-depressing	.41

FACTOR III (7.4)

bright-dreary	.85
colorful-drab	.76
happy-sad	.74
cheerful-depressing	.72
light-dark	.71
warm-cold	.58
friendly-unfriendly	.54
informal-formal	.45

FACTOR IV (5.9)

strange-familiar	.81
uncommon-common	.78
unnatural-natural	.68
different-same	.65
unreal-real	.61
confusing-clear	.55

FACTOR V (3.8)

hard-soft	.71
rough-smooth	.58
impure-pure	.53
heavy-delicate	.52
earthy-heavenly	.44

FACTOR VI (3.1)

plain-fancy	.76
simple-complex	.56
poor-rich	.45
earthy-heavenly	.40

FACTOR VII (2.4)

messy-neat	.79
informal-formal	.51

TABLE 21

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 6 VARIMAX FACTORS BASED ON 48 UNTRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF SEMI-ABSTRACT PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (22.7)

cheerful-depressing .88
happy-sad .87
comforting-disturbing .80
soothing-painful .78
warm-cold .77
bright-dreary .77
friendly-unfriendly .76
pleasant-unpleasant .73
light-dark .72
relaxing-tense .71
wonderful-terrible .63
colorful-drab .61
calm-stormy .56
delicate-heavy .51
beautiful-ugly .49
soft-hard .49
good-bad .42

FACTOR II (17.2)

meaningful-meaningless .81
powerful-powerless .78
interesting-uninteresting .77
exciting-dull .74
deep-shallow .72
inspiring-uninspiring .72
exciting-blah .71
expressive-unexpressive .68
strong-weak .67
emotional-unemotional .66
thoughtful-thoughtless .64
clever-stupid .63
aesthetic-nonaesthetic .62
symbolic-nonsymbolic .47
tasteful-tasteless .46
great-small .45
good-bad .44

FACTOR III (10.2)

noisy-quiet .78
chaotic-peaceful .73
complex-simple .66
moving-still .65
stormy-calm .58
confusing-clear .55
messy-neat .48
fancy-plain .45

FACTOR IV (3.9)

strange-familiar .76
common-uncommon .73
different-same .71
unreal-real .70
unnatural-natural .66

FACTOR V (2.9)

poor-rich .62
bad-good .56
ugly-beautiful .50
tasteless-tasteful .47
stupid-clever .40

FACTOR VI (2.4)

rough-smooth .76
delicate-heavy .42

TABLE 22

SUMMARY OF LOADINGS FOR MAJOR SCALES ASSOCIATED WITH 6 VARIMAX FACTORS BASED ON 48 UNTRAINED OBSERVERS' INDIVIDUAL RATINGS OF 8 SLIDES OF NON-OBJECTIVE PAINTINGS ON A 50 SCALE ART DIFFERENTIAL

FACTOR I (27.6)

expressive-unexpressive .82
meaningful-meaningless .81
inspiring-uninspiring .81
interesting-uninteresting .81
clever-stupid .80
deep-shallow .79
tasteful-tasteless .77
good-bad .77
powerful-powerless .76
aesthetic-nonaesthetic .75
exciting-dull .75
strong-weak .73
exciting-blah .72
rich-poor .70
thoughtful-thoughtless .68
beautiful-ugly .68
emotional-unemotional .67
great-small .64
symbolic-nonsymbolic .63
wonderful-terrible .52
pleasant-unpleasant .45

FACTOR IV (4.9)

smooth-rough .74
neat-messy .71
pure-impure .62
peaceful-chaotic .61
calm-stormy .59
still-moving .56
formal-informal .54
quiet-noisy .54
simple-complex .44
plain-fancy .42

FACTOR II (16.8)

cheerful-depressing .81
bright-dreary .81
colorful-drab .78
happy-sad .72
light-dark .72
warm-cold .69
wonderful-terrible .45
exciting-blah .45
friendly-unfriendly .44
exciting-dull .42

FACTOR III (7.7)

tense-relaxing .77
painful-soothing .76
disturbing-comforting .73
pleasant-unpleasant .52
unfriendly-friendly .50
hard-soft .49
stormy-calm .47

FACTOR V (3.5)

strange-familiar .77
uncommon-common .67
unnatural-natural .66
unreal-real .59
different-same .59
confusing-clear .56
complex-simple .42

FACTOR VI (2.6)

heavy-delicate .78
hard-soft .57

TABLE 23

SUMMARY OF FACTOR LOADINGS FOR PAINTINGS ASSOCIATED WITH 3 VARIMAX FACTORS BASED ON TRAINED OBSERVERS' MEAN RATINGS ON A 50 SCALE ART DIFFERENTIAL*

FACTOR I (38.9)
Semi-Abstract (S/A)

Kandinsky .95 (N/O)
Boccioni .93
Picasso .83 (Antibes)
Pollock .83 (N/O)
Chagall .80
Hogarth .77 (R)
Picasso .72 (Avignon)
Duchamp .71 (N/O)
Cezanne .70
Bronzino .62 (R)
Tamayo .61
Turner .56
Munch .46

FACTOR II (19.0)
Representational (R)

Ruisdael .88
Rembrandt .84
Pisanello .81
Hopper .76
Rothko .75 (N/O)
Cezanne .71
Bronzino .46

FACTOR III (15.4)
Non-Objective (N/O)

Mondrian .94 (Composition)
Vasarely .87
Mondrian .79 (Broadway)
Wesselmann .77 (R)
Kline .68
Duchamp .46

---

* Only those paintings with a factor loading of greater than .40 have been reported.

TABLE 24

SUMMARY OF FACTOR LOADINGS FOR PAINTINGS ASSOCIATED WITH 3 VARIMAX FACTORS BASED ON UNTRAINED OBSERVERS' MEAN RATINGS ON A 50 SCALE ART DIFFERENTIAL*

FACTOR I (33.5)
Semi-Abstract (S/A)

Picasso .95 (Antibes)
Boccioni .91
Picasso .90 (Avignon)
Chagall .88
Tamayo .87
Duchamp .81 (N/O)
Kandinsky .79 (N/O)
Vasarely .76 (N/O)
Hogarth .74 (R)
Turner .70
Munch .47

FACTOR II (25.1)
Representational (R)

Rembrandt .93
Pisanello .87
Ruisdael .86
Hopper .79
Cezanne .70
Munch .64 (S/A)
Bronzino .49

FACTOR III (15.6)
Non-Objective (N/O)

Mondrian .77 (Broadway)
Cezanne .76 (S/A) (Victore)
Rothko .73
Wesselmann .72 (R)
Bronzino .55 (R)
Mondrian .50 (Composition)
Kandinsky .42

*Only those paintings with a factor loading of greater than .40 have been reported.